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A TREATISE

ON THE CULTURE AND MANAGEMENT

OF

FRUIT TREES.

By CHARLES HARRISON, F. H. S.

London,

GARDENER TO J. A. STUART WORTLEY, ESQ. M. P. WORTLEY HALL, NEAR SHEFFIELD, YORKSHIRE.

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TO

J. A. STUART WORTLEY, Esq. M. P.

THE FOLLOWING TREATISE

ON THE

MANAGEMENT OF FRUIT TREES,

BEING THE RESULT OF MANY YEARS STUDY

AND EXPERIENCE,

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In laying before the Public the following Treatise on the Management of Fruit Trees, the Author has been guided by the advice and frequent solicitations of many Gentlemen as well as practical Gardeners, who, from the great success which has for many years attended his practice, have been fully convinced of the superiority of the system of management pursued by him over that which generally prevails.

After such repeated applications the Author considered it a duty thus to explain his mode of treating Fruit Trees. And in the following pages he has endeavoured fully and clearly to state his practice, and he hopes his attempt will be candidly accepted by the Public.

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A

TREATISE

ON THE

CULTURE AND MANAGEMENT

OF

FRUIT TREES.

CHAPTER I.

The proper soil for fruit trees, with directions for making fruit tree borders.

ALL soil contains more or less of vegetable or animal substances in a decomposed state, also of saline ingredients, which by becoming soluble in water afford sustenance to the tree that is planted in it. But as trees vary considerably in their nature and habit, it is necessary that the elements which afford food be varied in the proportion of their composition, so as to be suited to the constitution of each tree. For the quality and quantity of food supplied, and the support and protection afforded to the tree, will determine its capacity and produce. Particular attention is

therefore required in the composing and forming fruit tree borders, so that they may fully accord with the object in view.

The soil of a fruit tree border ought in all situations to possess a good degree of adhesiveness, but not so as to exclude at the same time an openness or looseness of texture; for whilst the former is required in order to retain water in such a degree that the soil be moist, but not wet, and thus afford nutriment to the tree; the latter is equally necessary, in order that whatever food is conveyed by water to the roots, may have free access, and also that heat may as readily as possible be admitted to them. In a soil possessed of such a tenacity and friability, the fibres will increase abundantly and run rapidly. And as it is principally by those that food is received up into the tree, consequently the more they are increased, the greater quantity of of food is extracted from the border, and the more the tree flourishes.

Such a soil as this is also suitable for either a hot and dry or cold and wet climate, when the substratum is formed as will be hereafter directed. For in the former climate it will readily absorb and retain a sufficiency of moisture, whilst it will not be soon rendered dry by evaporation, neither will its tenacity be so great, as to cause it in hot weather to cake and crack. And in the latter climate it will be so porous, that it will not be too

retentive of moisture, and it will also admit a due degree of warmth from the atmosphere.

The soil of a fruit tree border ought always to be of such a nature as to absorb and retain a greater degree of moisture in a dry, hot situation, than in a cold and wet one; this may easily be effected by a strict attention to the forming of the under stratum, and which is of great importance in promoting the fertility of the trees. For if in a cold wet situation, stagnant water is retained about the roots, it is certain to produce a diseased tree. And if in a hot and dry situation, the water which is received be permitted to drain away too rapidly, the soil would not afford a suitable supply of nourishment without considerable labour in watering.

A dark coloured soil is more heated by the rays of the sun than a lighter coloured one, when all other circumstances are equal, therefore a dark coloured soil is preferable to a lighter one providing it be of the quality already described.

When soil is found to possess too great a portion of clay, let some sand or road drift be mixed with it, and the whole be frequently turned over previous to planting the trees in it; also add some of the lighter sorts of manure such as well rotted Tanner's bark, vegetable manure, shell marl, or sea weed.

If a soil be too light, it may be improved by an addition of some of a much stronger

nature, as the lighter sort of clay, and an addition of well rotted cow dung.

It is always better to have a soil too light rather than one, too wet; for when it is found to be too adhesive after the roots of the tree have extended themselves in the border, a remedy to the soil cannot be well applied without damaging them; but when the soil is too light, it can be remedied, so as to afford the tree a sufficiency of food by an increase of manure or manure water.

If a soil contains too great a degree of salts of iron, or any other strong acid, it will in proportion be sterile. This may be ascertained by using a magnet to a small portion of the soil, when the iron will cleave to it, and the proportion of each may be ascertained; a good addition of quick lime will reduce the sulphate to a manure, and thus bring such a soil to a fruitful condition.

None of the kinds of fruit trees treated upon in this work will require a soil more tenacious than that before described; but some will require it to be made rather lighter than others. Apples and Pears, require a strong loam, but rather the lightest for the Pear. Plums, Cherries, Peaches, Nectarines, and Apricots, a good deal lighter than for the Apple and Pear. *(See further remarks in the Chapter upon each kind of fruit tree.)*

In forming a fruit tree border, the following is the method I pursue when the under

stratum is wet. The depth of it should be three feet at the wall, and two feet six inches at the front, also twelve or fourteen feet broad. The surface of the under stratum must be so formed as to have an inclination from the wall to the front of the border, of twelve inches. After this is done, let a drain be made to run close to the wall, and in a direction with it, also another to run parallel with it at the front of the border. These drains must be open stone drains, and be so made that all superabundant water can be carried entirely away from the border. The drains must be so constructed that the tops of them may be about three inches higher than the surface of the following composed substratum. After the drains are formed, there must be laid all over the surface of the under stratum, three inches thickness of moderate sized gravel, (if gravel cannot be had, stones or brick bats broken to a small size, may be used for the purpose) upon this spread about one inch thick of fine gravel, or instead of it, strong road drift; then let the whole be well rolled or beaten firm together. After this is done, lay about three inches more of gravel or small stones which must also be rolled to an even surface, but not so as to bind them very close together. This method of forming the substratum of a fruit tree border ought always to be attended to when the soil of the border is a very strong loam, unless

the bottom is rocky or shaly, when it may be dispensed with.

The formation of the substratum of a border in a hot and dry situation, or where the natural substratum is too open, must be according to the following method.

The border must be the depth before described, also the same breadth, and the surface of the substratum must incline from the wall to the front of the border, about four inches.

Two drains must also be made as in the other situation described. After the drains are constructed, let six inches (at least) of strong clay be spread over the bottom of the border. This must be beaten or rolled to an even surface; upon this lay about two inches thick of moderate sized gravel or stones, then one inch thick of small gravel or strong road drift, after which let it be well rolled, and lastly, two inches more of small stones or gravel which must be rolled to an even surface. After this is done the soil may be thrown into the space allotted for it. The surface of the border must in all situations, have the same inclination as the substratum.

The practice of using small stones or gravel for forming the under stratum, is very far preferable to paving or slating it, which is practised by some persons. For the latter method prevents the water regularly settling down below the border, and a few inches of the soil nearest the slates, &c. is kept in a

moist, sour state by it. But the stones or gravel prepared as directed, allow any undue portion of moisture to filter away, whilst at the same time, they prevent the roots of the trees from penetrating the injurious substratum equally as well as in the case alluded to.

The border ought always to be made three months at least before the time of planting the trees in it, so that it may not settle much afterwards. Although this method of forming the border may be considered troublesome and expensive, yet attention to the method laid down, is of the utmost importance to the fertility of the trees. And the expense thus incurred is not near so great as what it would be afterwards, in endeavouring to render the trees healthy and productive, when such attention had not been paid at the first formation of the border.

CHAPTER II.

The situation and formation of Espaliers.

It is a practice very generally adopted to have a walk at the front of a fruit tree border to run parallel with the wall, and at the inner side of the walk, and about four feet from it to plant the Espaliers. The advantage of having them so situated is, that the border in which the trees are planted, can be properly drained of any undue quantity of moisture, which draining is indispensible in such a situation, for a great quantity of water generally sinks down at the sides of the walk; but by attending to the following directions, no injury whatever will be sustained from that source.

The surface of the substratum of a wall tree border, is directed to be so constructed as to have an inclination from the wall to the front of the border of twelve inches, also at the front of the border a drain is made. As the soil of a wall tree border is commonly somewhat deeper than the general soil of a garden, a substratum, with a similar inclination to the wall tree border, must be formed for the border in which the Espalier trees are to be planted. The substratum must regu-

larly incline from three feet inside the Espaliers, down to the drain at the front of the fruit tree border. Betwixt the materials of which the walk is composed, and the under stratum, there must be about eighteen inches deep of suitable soil for the roots of the wall and Espalier trees to run in, so that they may proceed forward without any obstruction whatever. *(See remarks on this subject in making Vine borders.*

A cast iron trellis resembling a common street railing has been tried and found to be somewhat cheaper than a wooden one, but its chief merit is in the durability of it. A cheaper trellis, and equally as advantageous may be formed by having round cast iron posts fixed in stones, placed at six feet apart, and two bars, either of wood or cast iron, so long as to reach from post to post, and so constructed as to remain secure, when once fixed. These cross bars must be fixed, one along the top, and the other about twelve inches from the ground. There must be holes in them at nine or ten inches distance, so that wire may be stretched upright from one bar to the other, in order to secure the trees to them. Care must be taken to keep the trellis well painted, or coloured with coal tar. The height of the trellis ought not to exceed five feet, otherwise it would obstruct a general view of the garden, and also cause a great deal of shade.

CHAPTER III.

The Aspect for each kind of fruit tree, with directions for properly arranging the trees.

THE Aspect for some kinds of fruit trees may be varied according to the climate in which they are planted; for in some situations, one sort may require a south Aspect, which in others, will do equally as well against either an east or west; therefore the distribution of the trees will depend upon existing circumstances.

Never plant in cold exposed situations, a tender sort of fruit tree against an Aspect upon which the sun's influence does not fully operate; for although the soil of the border be suitable, yet the tree will not be productive, without the full influence of the sun upon the tree and border. This deficiency of heat may in some degree be obviated where there is the advantage of flues*.

---

* All garden walls ought to be furnished with flues, in order in late seasons to assist the maturing of the fruit buds, as well as the ripening late fruit, and to protect bloom and young fruit from the severity of frost in spring; (this is more particularly required in cold situations,) the expense of erecting a flued wall being the same as a solid one, for what is added in labour to the former is saved in materials.

In exposed situations where the walls are not flued, neither have the benefit of woollen nets for protection, *(See Chapter on protecting the bloom of wall trees)* never plant any sort of fruit tree that blooms early in the Spring against an east Aspect, as on that Aspect early bloom is very liable to be injured and destroyed by frost and cold winds.

As no one arrangement of wall trees will equally apply to all situations, I shall state what sorts will prosper well upon each Aspect, in a situation as elevated and cold as that at which I have the management of fruit trees, and which is as high above the level of the sea, as most gardens in the kingdom, also much exposed. Where the situation is different, the Aspect of a tree may be varied accordingly. Apples, Morella and May Duke Cherries, with any of the late blooming kinds of Plums, against an east Aspect; Pears, Apples, Cherries, and Plums, against the west Aspect; some of the choicest early kinds of Pears and Plums, against a south Aspect; Peaches, Nectarines, Figs, Vines, and Apricots, against a south Aspect. On a north Aspect plant Magnum Bonum and Wine Sour Plums, also Morella Cherries.

Where there is a great extent of wall, it is advisable to plant trees of the same kinds, against different Aspects. Such as one or two May Duke Cherries against a south Aspect, which will ripen earliest, next against

either an east or west, and lastly against a north Aspect. By observing this method with Cherries and Plums the fruit will ripen in succession, and thus a supply of them is considerably lengthened. Also where there is a great extent of wall, always endeavour to plant together the early blooming fruit trees. For those kinds that bloom earlier by two or three weeks than others, will, through the severity of the weather require some protection, by heating the wall or otherwise, when, if early and late kinds were mixed together, the late sorts which did not require such protection, would be forced by it; which in bringing out the bloom earlier than its natural season, causes a great deal of trouble to preserve it, which would not have been occasioned had the bloom been permitted to expand at its natural season. Where the trees have each a separate protection of netting, &c. this injury will be avoided. These remarks do not apply so immediately to the southern and warmer parts of this country, as to the colder ones, but a knowledge of the climate in any situation must direct in the adopting suitable means.

The distance at which fruit trees are to be planted apart, must depend upon the sort of tree, and the height of the wall. For to plant trees at the same distance from each other, although of the same species, but whose habits are materially different, would

not be acting judiciously. If strong growing kinds, and dwarf kinds, are to be planted promiscuously against the same wall, their distance from each other must be regulated agreeably to the habit of the tree. The distance for each kind will be found in the article upon them.

CHAPTER IV.

On the choice of a fruit tree in the Nursery, with directions for pruning it previous to planting.

In the choice of fruit trees all possible care and attention is necessary, for to have a tree that does not give satisfaction, after being at a considerable expense in walls, borders, &c. is a great disappointment.

Of whatever species or variety your fruit trees are wanted, choose those that are vigorous and straight, and of a healthy appearance.

Whether they have been grafted or budded, be careful to select those that have been worked on young stocks. Grafts and buds are sometimes put into old crooked stunted stocks, but it is a very rare case to find such to succeed; on no account whatever choose one of this description. Those trees that are healthy, always have a smooth, clean, shining bark. Some people reject all young trees that are strong and luxuriant, I do not consider that of importance, because by removing them, the luxuriancy to which they were subject before, is checked, and after they are planted and headed down as will be hereafter di-

rected, they will not fail to become healthy and fruitful.

Trees that are mossy, or have a rough wrinkled bark, or of a low slender growth, or such as are affected by canker, (which shews itself in the young wood and generally two or three inches above the graft or bud) are to be rejected. If the tree be a Peach, Nectarine, Apricot, or Plum, and any gum appears on the lower part of it, do not fix upon that. Let the tree you fix upon (if a dwarf) be worked about six inches from the ground, and only one graft or bud should be upon each stock, for when there are more the tree cannot be brought to so handsome a form.

I prefer maiden trees of one year from the working, with their entire heads, because I consider it of great importance to the future success of the trees, to have them from as early a period as possible under my own care and management, for without very great attention the first three or four years after budding or grafting, a tree may be so disfigured that it cannot be rectified, and may also have suffered so much by injurious treatment, that it cannot easily be recovered afterwards.

If a tree has been allowed to grow for two years after budding or grafting without being headed down, such a tree is not so good as one that was headed down after having

grown one year from the working, because some of the buds at the bottom part will very probably have broken and made shoots the second summer, but they are generally very weak, by reason of the tree having to support such a large head of branches, and for want of a proper degree of sun and air; also it very frequently happens that such weak shoots perish in winter, and when the tree is cut down afterwards, its branches are generally placed in a very awkward manner. If the graft or bud was very weak the first year, and not cut down on that account, but left to grow another season, it will do provided it has grown well the second year, because the shoots being weak the first season, the side buds will not have pushed as in those which grew more freely.

I before remarked that a tree of one year old is what I prefer, yet some people are desirous to have trees that will furnish their walls more speedily, and bear fruit immediately. This object may be very readily obtained, for trees of this description may be had at most of the public nurseries. The only objection I have to this method is, that I find it very difficult to obtain them from those places uninjured. I have practised this method of planting trees that have been previously trained for several years with great success, but they have been such as I have myself chosen of one year old, and

pruned and trained till they had attained the size required. When trees of four or five years growth after heading down, that are healthy and well furnished with fruit bearing wood close up to the centre of the tree, can be obtained, they will do well; but great care will be required in the taking up, removing, and planting them. It is very essential to have a tree that is well furnished with young wood in every part of it, particularly Peach and Nectarine trees, for when one of those kinds has, by injudicious pruning, been brought to such a state as to have branches destitute of young wood for one or two feet from their origin, it is with very great difficulty that it can be afterwards furnished with a proper supply. And it is particularly desirable to have a tree that has been trained for five or six years, suitably furnished in every part; for the wood that is made during a few years at the first training, is what afterwards forms the main branches. Therefore, whenever a Peach or a Nectarine tree does not answer the description given, always reject it. If a fruit tree of any of the other kinds is not properly supplied with wood, it may readily be obtained by shortening some of the branches, as they will push shoots a great deal more freely than Peaches or Nectarines.

Of whatever species your fruit tree is, that is fixed upon, be very careful in taking

it up, and more particularly so if it has been trained for a few years. This is frequently very much neglected by those who have this part of the business entrusted to them, the roots are so often cut and mangled by the spade and other means, such as pulling up the tree, &c. that by it, trees which in every other respect were likely to do well have been ruined. Let the tree be taken up with as great a portion of the roots as possible, therefore take the soil away round the tree so wide and deep, that it may be loosened underneath, so that the roots may not be broken by any violence in raising the tree up, or mangled by digging amongst them. Never let either spade or fork be put into the earth near to the bole of the tree, as the main roots are very liable to be damaged thereby, and when one or more of such roots are split and not cut away, or some other means employed to remedy the injury sustained, the tree is generally diseased afterwards; therefore great care should be taken not to occasion such injury.

Whenever, (notwithstanding all due caution,) any roots have been accidentally broken, split, or otherwise damaged in taking up the tree, let them be cut off; or if they cannot be very well spared, let the damaged or bruised part be pared clean with a sharp knife, and an application of the following composition be spread over the wound in or-

der to keep the wet from it, which otherwise would injure the tree. To equal parts of soft soap, and tar, add a little bees wax, let them be boiled together, and when cold they may be used.

The necessity of pruning in and dressing mangled roots, is more particularly required in trees of the stone fruit, such as Peach and Nectarines, &c. for without the application of some remedy, they gum at the roots, which defect if not counteracted, very materially injures the upper part of the tree. And from this circumstance, I have seen trees so affected as never to recover afterwards; when if the little attention already directed had been applied, such injurious effects would have been prevented.

Should a strong leading root be damaged near to a lateral one, it should be cut off close to it; for I have observed that when such a strong root has required pruning in, and it has not been cut close up to the last lateral, but an inch or more has been left, that the part so remaining has frequently rotted, and that afterwards the upper part of the tree has been affected by it. I have taken up trees that were sickly, and have found the cause originating in the manner alluded to. The reason of such part rotting is, the descending fluid having a channel so near the end of the part left, it is diverted into it, and spends itself in the nearest fibres;

and the formation of a root, or fibre, at the extremity of the part left, is thereby prevented. It may sometimes arise too from the circumstance that no eye has been left upon such part from which to expect a root, for I have frequently noticed in fruit trees that have been planted out in the natural ground, that lateral roots form themselves nearly as close to each other, as the buds are upon the shoots in the upper part of the tree. The small fibrous roots do not require so much exactness in pruning them to a lateral, as the larger ones do, because they will more readily push new roots. But it is always necessary in pruning any root whether large or small, to finish by a clean smooth cut.

A young tree likely to do well should have roots nearly corresponding to the branches, at least, it should have one strong root in a similar proportion to the bole of the tree, with a proper distribution of branching fibres. Healthy roots are always smooth and clear, the colour of them varies a little according to the sort of the tree, but the older the roots are, the darker the natural colour is.

When a tree has such a number of small roots as to form an entire tuft or mass of fibres, it is an evident sign of constitutional weakness, unless it has been planted in poor soil, or being confined in a pot, or otherwise, which will always be found to cause it to

produce a greater quantity of fibres in the same length of root, than it would have done had it not been so confined. And when such a tree is turned out of its pot and properly planted, it will recover its natural habit and do well afterwards. But when the tufty appearance of the roots cannot be so accounted for, the tree should be rejected.

After the tree is taken up, be careful in conveying it to the place where it is to be planted, so that the roots are not chafed or rubbed, which would injure it considerably. If trees are to be conveyed a considerable distance, they should be well guarded by straw or otherwise, in order to prevent injury.

All damaged bruised roots should be pruned as soon as the tree is taken up, but if it be required to prune away any sound good roots, that must not be performed until the time of planting, which ought to be as early as possible after the tree is taken up. When the tree cannot be conveniently planted in a short time after taking up, let it be laid into some soil, and the roots covered to preserve them from injury. Trees that are to be conveyed a considerable distance will not suffer materially from being out of the earth for a week or ten days, provided they are packed up close at the roots, which in such cases should be well attended to; because the ends of the roots being so very tender, they are soon injured by a strong frosty air.

Should a tree have been taken up for such a length of time or even longer, and the roots have become shrivelled and dry, I always immerse them in strong soap suds (in a cold state) for two or three hours, after which I plant it.

It sometimes happens that roots are formed in two separate whirls round the trunk of the tree, this is frequently caused by transplanting the stock in an improper manner, for if the lower part of the soil in which it was transplanted be poor and barren, and the stock be planted deep, the roots which were upon it at that time, will seldom make much progress afterwards, and a new set of roots will frequently form themselves near to the surface where the soil is better. Also if the stem of the stock be injured just within the surface of the soil, it will generally push roots at such a place, although the stock was properly transplanted. When two separate whirls are formed, it very generally happens that the lowest tier of roots is weak and stunted, whilst the upper one is healthy and vigorous. It is very evident under such circumstances that the lowest should be pruned away, because the sap has in that case in a great measure deserted such roots, which appears by their weakness, and by the trunk of the tree below the upper whirl of roots, being generally smaller than it is above them. In pruning them away, cut through

the main trunk close underneath the upper whirl of roots. It occasionally happens that both whirls of roots are good, if they are not more than four or five inches apart, let them both remain; but if they are further apart than that distance, let the lower one be pruned away as directed.

My reason for retaining the upper tier of roots in preference to the lower one is, that the tree thrives better with them, and more particularly so in trees of the stone fruit kind. Also the necessity of pruning away the lower whirl of roots when they are far apart is, that if both were allowed to remain when the tree was planted, the lower roots would be too deep in the soil to derive much benefit from the sun and air, and if planted in a border that has a bad subsoil they would by immediately striking into it prove injurious, by causing the tree to canker or be otherwise diseased.

When a tree is supplied with a corresponding quantity of roots when compared with the top as before observed, do not cut them away, as is the practice of many persons, with a view to obtain new ones, for such will be produced in abundance from the sides of those with which the tree is at present supplied, the act of taking up and replanting the tree essentially contributes to promote their increase. Besides the young fibres being in an active state soon after planting,

very much contribute to the speedy establishment of the tree, which should always be promoted as early as possible. The only exception I make to the above practice is, when the fibres are very much withered and injured from being out of the ground a long time, or are otherwise damaged, in which case pruning away such injured and damaged parts is requisite. Also should the fibres be more numerous than desired, cut some of them clean away to their origin; for if they be only shortened this will cause them to send out more fibres than before.

Any strong roots near to the trunk of the tree, that have lain across before taking up, must now or when planted, be placed in their natural direction, if possible. If it be found necessary to retain such roots for the benefit of the tree, this must be done; but if not, prune them in such a manner that they will not be likely to grow in that distorted position again; for if they were allowed to continue in that direction, they would be exceedingly injurious to the trees, particularly in trees of the stone fruit; for by it a proper circulation of the sap is prevented, and they are more liable to canker. When the fruit tree is to be planted, in order to place it properly against the wall, such roots as are in a direction that prevents its being done, must be pruned. If the tree has a sufficiency of roots without them, let them be cut clean

away, but if not, and the roots cannot be placed so as to run in a direction on one side, let them be cut back near to the trunk of the tree; and if there be a side root, let it be laid in such a direction, as that it will run from the wall.

The shortening of such roots in the manner laid down, must not be adopted unless absolutely necessary; which will seldom be the case, but in extreme cases it may be practiced. For when roots are allowed to run in a direction to the wall, it always injures the tree.

All roots that are inclined to strike down to the bottom of the border should be cut away, providing they cannot be placed in an horizontal direction. For when allowed to remain in their natural position, by striking so perpendicularly into the under stratum, they are injurious to the trees; by causing them to canker, and be otherwise diseased.

In pruning away roots, always let them be finished by a clean cut, and in a sloping direction; letting the slope be towards the under stratum, so that the wet may not be allowed to lodge upon the part so cut.

When any large wounds are made, let them be covered with a composition; *(See page 19)* this applied to the wound keeps out the wet and prevents it from damaging the tree, which is the chief intention of compositions used in this way.

In respect to pruning the tops of young trees, I never do it at the time of planting them, (unless they are sickly) providing they are planted in autumn, but if they be planted in spring, and that season far advanced, it will then be necessary.

If trees are removed that have been trained for three or four years, and are not properly supplied with young wood, they must be cut down, either wholly, or partially, in order to obtain a sufficiency. In practising this upon Peach and Nectarine trees, always prune so as to have a leading shoot close below the cut, as it is very rare they will push a shoot below unless there be a lead. This attention is not so particularly required in other kinds, such as Apple, Pear, &c. as they will generally push forth shoots, although no leading ones were left; but in all kinds the younger the wood is, the more certain are shoots to be produced. If a tree that has been under training for one or two years, should have only one good strong leading shoot, and two or three weaker ones that do not proceed from it, let the weak shoots be pruned clean away, and shorten the strong one, from which a handsome head may afterwards be formed.

Espalier trees require attention in the same particulars as are laid down for wall trees, only the roots can be allowed to run on every side, which cannot be done to wall trees.

CHAPTER V.

On the season and method of planting fruit trees.

FRUIT trees may be planted from the fall of the leaf until the rising of the sap in spring, but an autumn planting is preferable to any other when the soil is a suitable one. Nevertheless it is advisable to plant at different times according to the nature of the soil. If the borders are prepared agreeably to the directions given, in the Chapter on the choice of soil and on the formation of fruit tree borders, and have been formed such a length of time as to be fit to plant in at the latter end of October, or the beginning of November, this is unquestionably the best season for the performance of this work. For if the trees be planted then, they will in many cases have pushed forth some new roots before the commencement of severe weather, and will have partly established themselves before the moving of the sap in the spring following; which will greatly assist them in making new wood the ensuing summer, and this will be considerably more vigorous, than if planting them had been deferred until spring. Therefore planting the trees at this

season ought to be attended to, when it possibly can be done.

If planting is to be performed in winter, always do it when the weather is mild, as a frosty air soon damages the tender fibres. But whenever the borders are of a wet heavy soil, the planting must be deferred until spring; the reason for so doing is, that the roots will not strike so soon in such a soil, as in one lighter and more suitable for the trees, unless they be planted at the end of September or very early in October, when they probably might strike root before winter. But if not planted as early as described, it very rarely happens that they will strike root until spring, consequently the trees would have been much better to have remained in their previous situation until the time of their removal at the end of March or early in April, for the removing them certainly gives them a check, and by the soil being of a cold and wet nature, instead of the roots being benefited they are more frequently injured, and sometimes the tender fibres are rotted off. And in the spring when their assistance is wanted to aid in the speedy establishment of the tree, those rotted fibres spread their injurious effects to other parts of the root, and thus retarding instead of promoting its welfare.

Whatever time of the year you may chuse for planting in, do not let it be performed in

wet weather, for in order to assist the roots in striking into the soil as soon as possible, it is requisite to press it a little, so that it closes upon them, which if done at such time the soil would become like mortar; and when such soil becomes dry, it generally bakes very hard together, and in that state is very improper for young trees. It also frequently cracks afterwards so as sometimes to break the tender roots.

But if the planting has been deferred until spring, and it is high time that the trees should be planted, and the weather should still continue wet, let as much mould as is necessary for the size of the hole be thrown out, and a few barrows full of drier soil be substituted for it. The soil should be of the same quality as the border, and if none of this has been preserved under cover for this purpose, let some from the border be taken and dried, till in a proper state wherein to plant the tree.

When the planting is to be done, (the borders having been made a suitable time previous) mark out the proper distance from tree to tree as the respective sorts require, *(See directions for this in the treatment of each)* the longer time the holes are made before the time of planting the trees, the better for the soil, as it gets enriched by the atmosphere.

The size of the hole must be regulated ac-

cording to the extension of the roots of the tree to be planted. It is the practice of many individuals to make such small holes, that when the roots are placed in them, they cannot be properly extended; on the contrary they are frequently obliged to be unnaturally twisted and cramped, in order to get them in. The roots of trees are naturally inclined to proceed in a straight direction outwards, therefore it is always proper to let them be placed as much as possible in such position. The roots of those trees that have previously grown in pots, will particularly require this attention. But it is a practice with me not only to make holes so large as to admit of the roots being fully extended, but twelve or eighteen inches more than is required for that purpose.

My reason for having the holes so much wider is, that when a hole is made only just as far as the roots extend, they upon pushing forth strike immediately into the soil that has not been so lately lightened up as that wherein the tree is planted, and which will consequently settle more than the other; and when the roots begin to establish themselves in the other part of the border, the ends of them are unnaturally forced up, and out of their proper direction, this is more particularly the case with those trees that are planted late in the winter or in spring. But if the trees are planted in November or December, they

will not be thus liable to injury, because the roots will not begin to spread until spring, when the soil in which the tree is planted will generally have settled equal to the other part of the border. But to the trees planted as early as the end of September, or as late as the end of March, which generally will push roots soon after they are planted; the injurious effects stated will be the result.

Great care must be taken that the trees are not planted too deep in the soil, as it is always injurious to them. I advise that the roots of fruit trees against a wall, be not planted more than six inches deep in such a soil as directed by me for borders. Let it be observed, that where the soil is not as directed by me, plant nearer the surface than six inches in wet heavy soils, and deeper in those that are lighter. When trees are thus planted, the roots will find their way down into the border, or along the upper part of it in search of necessary food, when on the contrary, if placed too deep, they cannot soon find their way to the surface, unless in a border whose direction is considerably sloping, which form should always be avoided. *(See formation of fruit tree borders)* But although the roots of those trees that are planted too deep may after some length of time reach the upper part of the border, yet they will be along while without having enjoyed the benefits from sun, rain, &c. which

they would have done had they been properly planted. Neither will they have made such progress, or have been so fruitful, nor the fruit of so good a flavour; but by being planted at the depth directed, the trees will derive every advantage from sun, air, and rain.

Great care will be required in digging the border for the cultivation of any esculent or vegetable that the roots are not damaged, for when they are, considerable injury is done to the tree, which will frequently evidence itself afterwards in the upper part of it by canker, &c.; also by the production of suckers from the roots, which generally are caused by wounds inflicted by the spade in digging the borders, for the sap frequently forms a callosity at the wound, and the production of suckers is the consequence.

Let the hole be made its proper extent, and about nine inches depth of soil be thrown out; upon the soil inside the hole, spread about three inches thick of well rotted cow dung, this must be well incorporated with soil so as to raise it to within about two inches of the level of the border, taking care that the surface of the soil inside the hole has the same inclination with the border.

The root of the tree having been previously pruned and prepared as directed, let it be placed upon the soil so levelled, the budded or grafted part to face the border, and the

bole to be about six inches from the wall, letting the head incline towards it; spread the roots regularly in the hole like a fan. Any distorted ones must now be regulated, and if the plant has previously grown in a pot or tub, the roots must be altered from the manner in which they have been forced to grow, to a proper direction. For want of this attention at the time of planting, to trees that have been turned out of pots or tubs, I have observed some at ten years afterwards that have made no more progress than they would have done in two years, had they been properly planted.

Do not let any roots point towards the wall, for when they run in that direction, on reaching the wall, they are obliged to turn on one side, and by forming an angle against it, they are generally injured, particularly so in stone fruit trees. For gum oozes out at such places, which detains moisture, and the tree frequently begins to canker there.

When the roots are properly spread, let about three inches thick of the soil that has been thrown out of the hole (and previously broken fine) be gently put upon them, upon this lay one inch thick of well rotted cow dung, and lastly two inches more of soil. When this is done let it be gently pressed down by the foot, always beginning at the extremity of the roots, so that the ends of

them may thereby be kept in their proper position. Then let the soil be levelled and raised so high, that there be a mound of earth about three inches higher than the border, to allow for settling. Always have the edge of the mound a little higher than the other part of it, so that it will hold the water which will be applied, then let the tree be fastened to the wall. It is greatly to the advantage of newly planted trees to have them mulched, *(See the directions in the Chapter on Mulching)* this prevents the water when poured on the ground from running away, and occasions it to sink just where it is desired. It also prevents the water from washing away the soil, and protects the roots from drought and frost, as well as the earth from cracking. After this is done, let the tree have about three gallons of water poured over the roots, which assists the earth to settle close about them, and is a far better practice than that of shaking the tree at the time of planting, which is so generally done in order to get the soil to settle properly amongst the roots. The bad effect of such a practice is, that in raising up the tree, the roots are drawn forward, and the soil then being light about them, immediately closes up those spaces from which the ends of the roots were drawn, and when the tree is pressed down again, the tender roots cannot force themselves forward into the spaces they previ-

ously occupied, and are thus bent backward; and in this way they remain, and very frequently the ends of the fibres afterwards point straight down and grow in that manner, but when water is applied the desired end is obtained, equally as well as by shaking, and thus the damage described is avoided. The watering over the roots at this time also affords a portion of nourishment to the tree, which is very essential; because it has been deprived of a part of its natural support by removal. *(See watering the tops and roots of fruit trees.)*

If after the tree is planted there happens to be dry weather, the soil must be kept in a moist state. It will therefore be adviseable occasionally to remove a little of the mulch, and if the earth under is found to be dry, it must then have some more water. The quantity must be regulated according to the state of the soil, taking care that it is not kept too wet, for if the roots are kept in a very wet state by frequent waterings, instead of being an advantage to the trees, it rots the tender fibres. Unless therefore the soil becomes very dry, they do not require water at the roots after the first time, until they have begun to push, which will evidence itself by correspondent shoots at the top. It will be easily discovered when a tree is in too wet a state or in too dry a one. For when too wet, (if there be foliage) it will turn yellow, and

the bark will shrivel; and if too dry, the foliage will droop, and if no remedy be applied will fall away, and the bark also shrivel as in the other case. It is however better to keep a tree too dry, rather than too wet, particularly before it has pushed roots. It is very rare if the trees are planted in autumn, that they will require more than once watering at the roots, but they will probably want water applying to the tops several times. *(See Chapter on watering the tops of fruit trees.)* But in spring they require it more as the season advances, and circumstances occur.

As the roots of the tree extend themselves in the border, great care must be taken that they are not injured by digging. The border ought not to be dug deeper than five inches as far as the roots extend; this will be deep enough for the cultivation of those plants and vegetables which may be allowed to grow there, such as Onions, Lettuces, Endive, and any thing else of this kind.

The directions laid down as proper to be practised upon wall trees, will also apply equally as well to espaliers, with a few exceptions which I shall here notice.

The general depth of soil proper for a garden will do for espaliers, and if of a wet bottom it should be well drained. In the planting of the tree, let the soil be highest in the middle of the hole, so that the roots

may incline towards their ends, and be a little deeper than wall trees. This is necessary that they may not be injured by digging the soil for the cultivation of the annual crops of vegetables, as the quarters of a kitchen garden round which espaliers are commonly planted, require to be stirred to a greater depth than the borders. But let all possible attention be paid that the roots are not damaged thereby. The roots of espaliers must be allowed to extend themselves on every side, and care should be taken that when espaliers are planted near borders, nothing tall or bushy is suffered to overshadow them.

CHAPTER VI.

On the training of fruit trees.

First, of those that generally bear fruit upon spurs. In this class may be reckoned Apples, Pears, Plums, Cherries, and Mulberries. Various are the opinions concerning the most successful method of training fruit trees, and no one mode will apply with equal success to trees even of the same kind in every situation, this must therefore be varied according to the free growth of the tree or otherwise, as may appear necessary. After having seen and tried many methods for a long time, I find none to answer so well for the trees, as that which I here recommend.

In training the sorts of fruit trees before described, it is a very general practice (and has been strongly recommended by some writers on fruit trees) to train them according to the fan method. How great the success may be that attends the efforts of those who have so publicly and forcibly recommended it, I have not in all cases had the opportunity of witnessing, but in some I have had ample demonstration to prove its inadequency, and although I have never

seen such effects produced by it as to command my full approbation, yet there may have been instances which I have not seen where it may have succeeded; but I believe the trees cannot have been planted in such a soil and climate, as that to which I have been accustomed. The sorts of trees now under observation have a natural tendency to become luxuriant, and the training of them in the fan method encourages it; because the natural direction of the sap is to run upwards, and the more erect the branches are, the more is luxuriency encouraged, consequently the more unfruitful the trees. It is very evident that to train those trees in the fan way, whose habit is to produce already too much wood, will tend to the production of more, and that will be more luxuriant. In order therefore to bring such trees to a prolific condition, it is necessary that some means be employed with that express view. This may in most cases be effected by training them in an horizontal direction, for when the branches are in this position it checks the too free motion of the sap, and renders the tree productive of fruit; because the sap cannot proceed so quick in the branches, as when they are trained more erect, and thus more time is afforded for the application of the juices in the spurs and buds, which are essential to fruitfulness.

Although trees trained in this manner

will generally be productive, yet if one should be so luxuriant that it will not bear freely, let the branches be trained so that they regularly incline towards the ground, and the more luxuriant the tree is the greater must be their inclination. This will not only make such trees fruitful, but the fruit will also be finer; for as all the branches are trained in a pendulous position, the sap is regularly distributed and properly employed in the maturing of the fruit and fruit buds, whereas if only a part of the branches were trained horizontally, and the remainder more erect, which is the case in fan training; the sap would flow more freely in such vertical branches, and the effect would be in that part the production of luxuriant unproductive wood. And as the principal part of the sap would be expended where it had the least obstruction, consequently the other part of the branches would be weakly and the fruit small. This I have fully proved both in trees trained the fan way, and also in some that were trained as espaliers, and which in addition to the branches trained, I allowed to produce heads as standards. It evidently appeared that one part of the tree opposed the other, and this effect continued until the upper part of it was furnished with such a supply of branches, as were proportionable to the quantity of food received; then the upper part of it became productive,

and the other was weakly and unproductive. From these observations it will appear very evident, that to train such trees in the fan method is acting in opposition to what is desired, (viz. to bring the tree to a fruitful condition as soon as possible) and thus a much greater length of time is occupied in effecting this, than would have been the case had the tree been properly trained from the time of planting. This is particularly the case with Pear trees, some of this kind I have seen that have covered a space of twenty-four square yards of walling, before they became productive. But as some of the roots had then probably entered into the under stratum, and the tree had in so great a length of time considerably exhausted the fertility of the border, a proportional decrease in the supply of nutriment, brought the tree to a less luxuriant but more fruitful condition. But when again it became fruitful, a proportionate increase of support was required, but this could not be given from the border without a renewal, or frequent supplies of manure water, and if this were not given, the tree would bcome gradually weaker, and in a few years be as unproductive as before. Others I have observed that had been planted a similar time, and then became productive, which were able only to produce a crop of fruit every other year, and in some instances every third year, the weak-

ness of the tree being so great that it was not able to support a crop every season; but by having one year, or sometimes two years rest, it regained its strength so as to be productive in the order described. This unproductive state would be continued until the border was renewed, or food otherwise supplied. The bad effects stated were entirely the result of a wrong system in training the tree, and thus the most productive age of the tree, and also the fertility of the border, had in a great measure been lost. For if they had been trained in the horizontal manner from the first forming of the tree, they would soon have become productive, and when this object is once attained, it is very easy to keep it.

As the horizontal mode of training is that which I prefer wherein to train such kinds of trees treated of, for the reasons assigned; I shall give particular instructions for the proper management, under the treatment of each separate kind of fruit. When trees of those kinds are not very vigorous, the fan method of training may, if desired, be adopted successfully. On the other hand when a tree that has been trained in the horizontal plan becomes weakly, I find it of great advantage to let the branches have a little elevation towards the end, for a year or two.

When this practice is adopted, it generally is attended with success in giving strength

to the tree. After it has acquired the vigour I wish for, I bring the branches to their usual horizontal direction. If they have been elevated a great deal, I only bring them down the first season, half way; and the remainder the season following. When this removal of branches from one direction to another is required, I always have it done very early in the autumn, as they will at that season more readily comply with it, than if deferred till near the winter; they will also bear it equally as well in spring when the sap is in motion; but the buds are then very brittle, and are in greater danger of being rubbed off, which makes it decidedly more advantageous to perform this process in autumn. Although I find this method of training peculiarly suited to the kinds of fruit trees enumerated, I do not deem it necessary to be practised upon the Peach, Nectarine, or Apricot, with one exception, that is the Moor Park Apricot; to which I have sometimes found it requisite to apply an horizontal training. All the other kinds of Apricots if planted in a suitable soil, will do the best when trained half fan, and half horizontally. In this case I let the branches rise to about half their length, which applies to fan training, and the remaining part of the branch in an horizontal direction; a few branches at the top of the tree must be trained wholly horizontal, so as to fill up every part of the

wall. Peach and Nectarine trees are not of so luxuriant a habit as the other kinds of fruit trees, and of the methods of training them, none is equal to the fan way; by this I mean, that the strong arms of the tree should resemble in form the ribs of a fan when expanded. Some persons have strongly recommended other modes of training as preferable to this for Peaches and Nectarines, I have tried them, but have not found them to possess such merits as to make them worthy of being recommended. Under other modes of planting or pruning from that which I practice, they may have their advantages; but from near forty years experience of the fan shape, I can strongly recommend it, and if properly attended to from the first planting and training, it will very rarely happen that there will be a vacant part upon the wall, however far the tree may extend; except it be caused by accident, and every part of it will be supplied with fruit bearing wood.

When a Peach or Nectarine tree is weakly, I let all the branches, particularly the lower ones, have considerably more elevation for a year or two, and remove them to their former direction when the tree has regained its strength. Also when trees are newly planted I allow all the branches to have a good degree of elevation for two or three years, regulating this according to the vigour

or weakness of the plant. If in any part of the tree a branch be weakly, let such be immediately elevated as much as possibly can be done.

Whatever method is adopted in training the trees, care should be taken to keep the two sides as nearly equal as possible; this may easily be done whether they are trained in the fan or horizontal method. When an accident occurs so that a part of one side is lost, such vacant part must be supplied as soon as possible. In the fan training this may readily be done, but cannot in the horizontal, but a new shoot or more (so that the vacancy be fitted up) must be trained in, from the main stem of the tree if there is an opportunity, if not, a lateral shoot or more must be trained from the branches. If there be buds upon the main stem at such places as shoots are wished for, they may frequently be caused to push by making an incision over the bud in the form of an inverted v thus ʌ. This will easily be effected when a part of the tree has been taken away, as the sap operates more strongly in those parts to the production of new shoots, wherein to spend itself. If there should not be a bud in such a situation as desired from which to expect a shoot, one may be inserted, and in this manner a supply may be obtained.

If in the spring or early part of summer a strong vigorous tree is deprived of its fruit

by frost or any other injurious cause, a greater quantity of young shoots must be retained in every part of the tree during that year, and such overplus of wood be pruned away at the winter pruning of the trees. If a tree thus deprived of its fruit be not very strong, only the regular portion of young wood must be allowed to remain upon it.

When a shoot or branch is injured by blight, and there is reason to fear it cannot be recovered, let it be immediately taken away, as the effects of blight will without this caution very frequently spread to other parts of the tree. The taking away of the branch makes room for a supply of young wood, which will be stronger by an early removal of the damaged part.

For espalier trees no method of training whatever is equal to the horizontal, the small compass in which the trees are obliged to be kept requires such a direction for the branches, in order to make them fructiferous. And were very high trellisses formed, so as to admit of the trees being trained in the fan method, such would be very objectionable by reason of the shade they would cause, and the trees would also be deprived of the benefit of a warmer temperature, which those less elevated receive, by the effects of which fruitfulness is considerably promoted. Attention to this latter circumstance is par-

ticularly required to some kinds of fruit trees when trained as espaliers, for even in some seasons trees of the same kind that are trained against a wall, with all the superior advantages of reflection, &c. are with great difficulty brought to a fruitful state.

CHAPTER VII.

On the most proper season for pruning fruit trees.

THE general pruning of fruit trees, is indifferently performed by many persons at any time from autumn to spring, and it may be done so without any very great injury to them, providing that mild weather is chosen for the purpose, but when there are advantages to be derived by the seasonable application of any means to the trees, it is certainly advisable to avail ourselves of them. With this view I always prune the fruit trees under my care as soon as I possibly can commence the business, that is to say, as soon as ever the leaves begin to fall, and in some cases, when the wood is well ripened, before this happens; for when the wood is properly ripened, the leaves will come off by the least touch, and pruning may then be safely performed without causing any injury to the buds. But were they pruned before the wood was properly matured, the forcing off the leaves would then be injurious to the buds, and would considerably retard their advance to a due state of perfection. The pruning of the trees at so early a season as recommended, affords great assistance to

the fruit buds, in bringing them to a proper degree of maturity; for they will be much stronger and bolder, than if it had been deferred until spring. Although it is highly advantageous to prune trees (when wood is properly ripened) so early, yet when the wood is green and the buds are not arrived at a mature state, it is requisite in such instances to defer pruning until spring, taking care however that it is performed before the moving of the sap. The necessity of this arises from the circumstance, that as the wood is not ripened in autumn, the sap is then in an active state, and will continue so until the frost, &c. causes it to become stagnant or sedate, and if the shoots were shortened whilst the sap was in motion, the buds would be considerably injured, and the tree weakened. Such unripe shoots are also more liable to suffer by the severity of winter, and when the pruning is deferred until spring, all such parts as may have been affected by the weather, can be removed to the extent to which the damage has been sustained. As the pruning of such unripe wood in the autumn would be injurious, so it frequently is when it is done during winter, and the more so, according to the severity of it. Because whenever a cut is made on such green wood, the frost generally affects it, as the sap is not so dense, nor the wood so firm, as to be able to resist its intenseness. For the same reason

I always leave the pruning of Fig and Mulberry trees until spring.

The superiority of spring pruning to that of autumn, is by the advocates of the former grounded upon this, i. e. that it may more certainly be discovered where a shoot will be produced for a lead the ensuing summer; and thus far it is correct, but if attention be paid to the obtaining wood to a proper state of maturity, and in the pruning of each kind agreeably to the instructions contained in this work, this object may always be secured unless some accident prevent it, and generally with more certainty than by a spring pruning. For at that advanced season, the buds are very brittle, and frequently many are rubbed off or bruised in the operation. I have noticed some persons prune Peach and Nectarine trees that were in a bearing condition, as late as April, when the bloom buds were just bursting; the effects that followed such a system were in numerous instances very evident, for soon after the blossoms had expanded, many of those situated nearest to the end of the shoots withered and dropped off, and the tree was also considerably weakened. Such a method of checking luxuriancy is used by many persons, but I never practice it, adopting other means for the attainment of that object. *(See treatment of vigorous trees.)* Young trees I uniformly prune at spring for the first two years after

being planted, being careful that it is performed (as already observed) before the rising of the sap.

Where there is an extensive range of wall trees it necessarily requires a considerable time to prune them, the method I pursue is, first to prune Peach, Nectarine, and Apricot trees, then any of the other kinds of fruit trees upon a south aspect, the next those upon the east and west aspects, and lastly those upon the north aspect. Particular directions for pruning each sort, are set down in the instructions for the treatment of the kind.

It will be proper in this place to caution pruners of wall trees against an error which is practised by many, to their discredit, to a waste of walling, and to the injury of the trees; *(this particularly applies to Peach and Nectarine trees.)*

The error I mean is, that by unskilful pruning, a tree becomes almost destitute of young bearing wood near to the centre or origin of the main branches, this is very frequently to be seen in the kinds of trees described, after they have been planted for twelve or fourteen years, and when they ought to be in their greatest perfection. Trees that have been planted and trained for such a length of time, and have had all the advantages arising from a suitable soil, I have observed to have branches en-

tirely destitute of fruit bearing wood, for three or four feet from the bole of the tree. This state of the trees will frequently be found to arise, from adopting a system recommended and practised by some persons, viz. of leaving all the shoots entirely unshortened in winter.

I have seen and tried this method in many instances and for many years, and I have always found it the same, and in the application of all other means I could use to co-operate with such a system, in order to render it successful, I uniformly failed, and could not keep a tree (after it had been so treated for twelve or fourteen years) properly supplied with bearing wood down to the bole. Such a tree I always found covered its space and exhausted the border much sooner, than if treated otherwise, it had also supported a greater quantity of luxuriant unproductive wood, as well as borne a much less quantity of fruit; the wood was at the same time long and naked, because the point bud generally pushed the first. And by the shoot of last year wood being left its whole length, it frequently happens that at the lower part of the shoot there are no new ones produced, by reason of the point shoot pushing first, and the sap finding means of expending itself there, or in a few more shoots near to the upper part of the last year wood, and thus naked branches are encou-

raged. It is this that must be guarded against and even must always endeavour to retain a new shoot as near as possible to the origin of the last year wood. The pruning of the shoots in winter as directed in its proper place very much encourages this. It must be admitted that the roots of a tree spread more and increase every year, consequently, the food received the ensuing summer by means of such increase, will require an additional extent of branches in order to be expended in such a way that the tree is not thereby thrown into a luxuriant condition; but such injury is avoided by allowing the tree a greater extent of wood every year, until it has covered its allotted space, consequently there is a proportionate increase of fruit to support, which moderates and regulates the tree in a proper way, so as to keep it in a fruitful state. When the tree has filled its allotted space, if it should then be inclined to shoot too vigorously, a greater quantity of fruit must be allowed, so that the extra portion of sap may be therein expended, but this will very rarely be the case, for by the time that the tree has extended so far, its tendency to luxuriancy is generally checked.

By attending to the proper pruning of the trees in winter, every advantage that is desired is promoted, and by a judicious management in other respects, wood may not only be obtained but preserved in every

part of the tree, and so that it will bear fruit down to the very bole, which will evidently be greatly to the credit of the gardener, the benefit of the proprietor, and will be equally conducive to the beauty and welfare of the tree.

In training and pruning young trees, particular attention is required to lay a good foundation for a supply in future years, for when this is neglected, and they are become naked as before described, it is with great difficulty that a supply can be recovered in Peach or Nectarine trees; in any of the other kinds it is more readily done. In shortening a branch, always take care to cut in a direction a little sloping, and so that the slope may be parallel in a contrary way to the nearest bud left. It is requisite to have a very sharp knife, that the cut may not be ragged, but clean, and in the operation, must be careful that the knife does not slip, so that any other branch may be cut or damaged. The proper distance of arranging the branches from each other, is laid down in the particular treatment of each sort.

The observations now offered, principally apply to the winter pruning; but a regulation of the trees in summer is also necessary, so that no greater quantity of new shoots are retained, than is required; *(see the particular directions for the performing of this in the treatment of each respective sort)* although the di-

rections for regulating the wood both in summer and winter be attended to, yet it will frequently be observed that in some parts of the tree luxuriant shoots will be produced, if wood be wanted they may be retained where requisite, but if not, they must be taken away as soon as possible*.

It is occasionally found expedient to cut away a large branch or more from a tree, this is found necessary when room on the wall is required, or to make space for a supply of young wood. When this practice is performed great attention is required lest more harm should be done than good. Peach, Nectarine, and Apricot trees, are more susceptible of injury from this operation than any of the other kinds of fruit trees; and a large limb ought not to be cut away unless a similar proportion be taken from the root, or the tree be transplanted. *(See treatment of Peach trees.)* In any of the other sorts of fruit trees such as Apples, Pears, Plums, &c. a branch or more may be safely removed. If there be a good lateral shoot to cut down to, always take care to do so; this is more necessary in stone fruit trees than in the other kinds which will generally produce a new shoot although nothing but a stump is left. If in the stone fruit trees there be not a lateral shoot to cut to, it is far better to cut

* See Chapter on Peach and Nectarine trees.

such a branch entirely away than to leave a bare stump, which almost always dies afterwards. But whenever I determine that it will be advantageous in a year or two to remove a part of the tree, I always take care to leave a good succession before I carry into effect, the removal of the part which I do not wish any longer to retain.

CHAPTER VIII.

The necessity and advantages of Spurring those kinds of fruit trees which are directed in this work to be treated in that manner.

In the following observations, there is laid down the method which I pursue with the different sorts of fruit trees that bear upon spurs; with the exception of those persons to whom I have imparted the method I practice, and who have adopted it through a conviction of its advantages, I never saw it practised by any but myself. A part of the plan is stated in a paper communicated to the Horticultural Society of London, in January 1818, Vol. 3d, page 41, how far the observations there stated have influenced individuals to adopt it, I can form no idea of, but I have reason to believe that it has been successfully practised by some. The process which was treated of in part there, is here more fully explained, and if the directions in pruning the tree agreeably to this system be attended to, success is the certain result, unless casualties such as frost and insects, counteract the advantages which otherwise would have been realized.

It is essential to those who have the ma-

nagement of fruit trees, to look forward to what is to take place hereafter; not only to consider the present welfare of them, but what may be necessary in years to come. It will be noticed in the particular treatment of this class of fruit trees, that I cut away partially and afterwards wholly the spurs at a very early period after they are produced, my reason for doing so I shall here explain. Around the base of each spur, there are generally several embryos situated under the bark, and when the old spur is allowed to grow without being shortened, or entirely cut down, such embryos generally remain in that condition; but if the spur be cut down it will almost certainly cause one or more of these to push forth, and in some instances this will be the case even by partially shortening an old spur. The advantage therefore of cutting away the spur at an early age is, that such embryos will more certainly push, than if the pruning be deferred to a much later period; for the younger the wood is of the spur cut away, the more certain is the new spur to be produced. For when the bark gets old it is tougher, and the embryo cannot force its way through it so readily as it can when it is younger. Besides it will frequently be found when the spurs have been allowed to grow for many years and have not been cut away, that some of the embryos will have

previously pushed, but from the old spurs having been allowed to remain, they had not received a due degree of support, and for want of it, and a proper admission of sun and air had perished. I have frequently observed this to be the case, and when such old spurs have been removed, there has been afterwards at such places, vacancies which always ought to be avoided as they look unsightly, and more particularly so when the spurs are far distant from each other. Whenever one of the embryos prematurely breaks, (that is, before the old spur is cut down) always be careful to preserve it, by immediately taking away a part of the old spur in order to give it strength, and admit a suitable portion of sun and air to it. Another advantage is derived by taking away the spur at an early state, viz. that the wound caused by cutting off the spur, is not so large as otherwise it would be, and it is also much sooner healed, and becomes nearly even with the branch from which the spur was removed; and thus those large protuberances which are so very generally to be seen, are avoided, and the beauty, regularity, and fruitfulness of the tree is increased.

In some kinds of fruit trees (which is noticed in the Chapter on the treatment of each) when the spur is cut down at an early period, the young spur which is produced is

almost certain to form a fruit spur the first year, and to be productive the second; but it very generally happens that when the spur which has been cut down was old, that the new spur will for two years produce nothing but wood. The cause of this seems to be, that when a spur is allowed to get large, the removal of it gives a check to such part, and when the embryo pushes forth a great portion of the sap is expended in the production of wood, instead of fruit buds, which would not have been the case had the pruning taken place at the proper time, and thus a year or more would have been gained in the production of fruit.

The advantages to be derived from having the spurs thus regularly shortened, are very considerable. The health of the trees is improved by it, and it renders them more productive, and the fruit will be a greal deal finer, and of a much better flavour; this will soon be apparent when the practice is adopted. All these good effects are promoted, by the fruitful part of the tree being brought into close contact with the wall. When the spurs are allowed to extend far from the wall, they will sometimes have an abundance of bloom upon them, but it generally drops off, and a very small portion of fruit sets. The reason is very obvious, the spurs being so long and close together, the sun and air (which are very essential to the tree at this

critical period) cannot have such access among them, as is requisite, in order to promote their fertility, and lichen or moss is thereby encouraged, which obstructs the pores of the wood, and prevents the tree from flourishing; and on these accounts for want of due support the bloom or young fruit drops off.

Another accident which frequently happens from the spurs being long is, that it often occurs in spring that there are two or three weeks of fine warm weather, which pushes on vegetation and causes the trees to bloom, this is sometimes succeeded by very cold weather for several days, which again gives a sudden check to vegetation, and the blossom being deprived of a considerable degree of support (from the reasons already assigned) is not able to withstand the effects of such sudden changes. Also by the spurs extending so far from the wall, they are more exposed to the frost and cold winds than if they were kept properly pruned as directed by me, and when the spurs are kept short they are much less affected by any change of the weather than what long ones are. Again, the trees from having the spurs long, are more liable to be attacked by insects, which are with more difficulty destroyed, as the composition directed to be used to fruit trees in the winter season in

order to destroy their larvæ, and so prevent their ravages in summer, cannot well be applied. The composition here alluded to, materially contributes to the health and fruitfulness of the trees, but its effects must not be expected to be so great in those with long spurs, as upon those properly pruned; because it has to contend with the disadvantages just now hinted at.

By reducing the spurs in the gradual manner as directed in this work, there will always be reserved a proper supply in every part of the tree, and these in a productive state; but were too great a portion of them removed at once, it would oppose the fruitfulness of the tree, because there would be an overflow of sap, which would be expended in the producing and supporting barren wood, instead of supporting and encouraging fruitful spurs, and thus one part of the tree would oppose the other, which ought always to be avoided. But by removing them in the order described it is kept in a regular state, by supporting a proportionate quantity of fruit and fruitful spurs. If a less quantity was taken away at once than what is laid down, for a healthy fruitful tree, those remaining would in many instances be too close together, and would thereby be liable to the defects and injurious consequences which originate and are caused by it. But

by the practise of the method recommended every possible benefit is afforded to the tree and fruit, which can be derived from such sources.

It will be proper to remark here, that after an old spur is cut down, the embryo will not always push the first season, perhaps not until the second, and in some cases not at all. But besides those embryos situated near the base of the spur cut down, there will very frequently arise new spurs along the branch in the intermediate spaces between the old ones, such must be retained and encouraged.

In pursuing the method of pruning in, and cutting down the spurs in the order and regularity described, every desired advantage will be obtained, which will fully compensate for the attention bestowed. But where such a regular system is not practised, as near an approximation as possible must be pursued, so that the spurs are not allowed to bear too long a period, neither extend too far from the wall, before they are cut either wholly or partially down, in order to obtain a new succession.

It will be observed in the particular treatment upon each kind, that there is a little difference in the time of removing spurs from espaliers and wall trees. The spurs of espaliers are allowed to grow a longer

period before they are cut down, than those upon wall trees, because they will admit of it a great deal better, as there is a more free circulation of air to the espalier than the wall trees. But as they are only allowed to grow one or two years longer before they are cut away, no very material difference arises to the pushing of the embryo from the origin of the spur removed.

CHAPTER IX.

The advantages and method of watering the roots of fruit trees.

It has long been a practice with me to water the roots of the fruit trees under my care, at those seasons of the year I deem necessary. The great advantages resulting from a proper attention to this treatment, will soon be apparent in the health and fruitfulnes of the trees. The quantity of water to be applied at one time, is not only as much as will moisten the surface of the border, but as much as will sink down to at least eighteen inches, which will be found to be a real benefit to the tree. It must be observed that the frequency of watering and the quantity to be applied at one time, as recommended in this Chapter, is suitable for trees when planted in such a soil and border as directed. *(See formation of fruit tree borders.)* But when the trees are planted in a soil and border materially different, the watering must be regulated accordingly. If the soil be stiff and wet, or upon a wet bottom, do not give more than one half of what I advise for proper borders; but if the soil be lighter, water more accordingly. Also when the seasons are wet, this watering must be

omitted, providing the borders are moist to the bottom; if not, a good watering ought once or twice to be given so as to effect this object.

The period of commencing this operation must be regulated agreeably to the following manner. If the weather has been wet previous to the opening of the bloom in spring, I do not water the trees at the roots until I judge that the border is becoming dry, but if the season previous to the opening of the bloom has been dry, I give each tree ten or twelve gallons of water at the roots, just before the bloom expands. If I have a sufficiency of manure water I apply that, but otherwise soft pond water. If pond water cannot be conveniently had for the purpose, it must be water that has been exposed to the atmosphere for three or four days previous to using.

By the application of this at the time directed, I find that the fruit always sets a great deal better than if it were omitted; as it very materially contributes to the production of perfect stamina and pistillum, without which watering, in many cases they would be defective, particularly Pear trees; also in dry seasons, generally the greater part of the bloom drops off, which is caused by the deficiency of support to strengthen it at the footstalk. This watering at the roots is more particularly required for wall

trees, as they have not the full advantages from rains and dews which standards have; but in very dry seasons it is indispensible for either wall or standard trees. If the weather continues dry during spring, but more particularly in summer, the watering of the roots should be regularly practised. Wall trees ought on no account to be neglected, they ought to be watered once a fortnight, and if the weather be very droughty, once a week. Trees on the south aspect, require more watering than those against any other; but this must be regulated according to the state of the border. Those on the north will not require watering more than two or three times during spring and summer, because the sun does not operate so powerfully upon the border on that aspect as any of the others, consequently the soil is more moist, and too much wet would retard, rather than promote the fertility of the trees.

In watering trees of the stone fruit, particularly Peaches, Nectarines, and Apricots, I omit it during such time as the fruit is under the operation of stoning, which when it is completed, I commence the watering again. My reason for omitting it at this time is, that if much water were then applied, the greater part of the fruit would fall off, because at that time there is a sufficiency of that kind of matter of which the stone is afterwards per-

fectly formed, and it is then hardening at the outer coat, and the deposition of much more sap in the stone should be prevented, for when water is given in any large quantity it produces so great a portion of sap, that the young wood cannot expend it, and thus too much of it forces itself into the stone, and by breaking the tender skin which forms the outer coat, it immediately turns black and rots, the fruit begins to shrivel, and afterwards drops off the trees. But by withholding water at the time directed, the fruit will always be found to stone much better. *(See this more particularly treated upon in the Chapter on Peach and Nectarine trees.)* This watering I continue until the young shoots cease to grow, when it is desisted from. The application of manure water greatly promotes the growth of the trees, I prefer it to manure in its solid state, (particularly for Peaches and Nectarines) because it has the essence or juices of the vegetable substances dissolved in it; and as water is the vehicle to convey such juices to the roots, it is by watering as directed transmitted to them, and by them to the rest of the tree. It not only causes the tree to grow more vigorous, but the fruit will also be larger and of a richer flavour.

When trees are very vigorous, I omit the watering, with the exception of the time of the bloom expanding, or when it is necessary to keep the tree from drought; and at those

times use pond water instead of manure water.

Newly planted trees I always water at the time of planting them, and without it is dry weather, I do not water again until they begin to push in spring. *(See the planting of fruit trees.)* For the first year after being planted, I do not give more than two gallons at one time, and that only when the ground is dry.

As the trees advance in growth during future years, I increase the quantity of water in proportion; because as the roots extend farther into the border, a greater space of ground will have to be moistened, in order properly to benefit the trees. For it is principally by the young roots and fibres, that food from the border is received up into the tree: this must be particularly attended to in full grown trees. The time of applying the water, must be a shady day, or the after part of a clear hot day. For when water is poured on the soil, and a day of hot sun immediately follows, the soil is liable to crack; but if the watering be attended to as directed, this will be avoided, because during the space of twelve or fourteen hours, the moisture will have diffused itself to a good depth in the border, and some will generally be exhaled during the night, and in the shape of dew applied to the leaves of the trees which is of great utility to them.

Previously to commencing the watering in spring, the ground should be loosened about two or three inches deep, to the extent it is intended to pour the water; this assists the water in sinking properly into the border. If the border be in cultivation by any esculent, &c. let the spaces between the rows be lightened up. When the soil of the border is very light, it will not require turning up so deep.

This practice, in order to assist the water in sinking properly into the border, is very far preferable to what I have observed to be adopted by some persons, who make holes in various parts of the border by means of a stake or iron crow; this method I consider does more harm than good, for I have seen the roots considerably damaged by it, some being split through the middle; the effects of which soon became apparent in the upper part of the tree, for I have observed trees of stone fruit to canker afterwards, which before this accident had no appearance of it.

Espalier trees do not require so great attention in this particular as wall trees do, because their roots can be allowed to extend on every side. Beside the dews fall more fully upon them, and they derive more benefit from the free circulation of air; nor is the soil dried so soon as that of the borders, by the great reflection of heat from the walls.

But espaliers, like standard trees, ought always to be watered when the bloom expands, unless the ground be very moist, also once or twice more during the spring and summer, which will fully repay for the trouble.

CHAPTER X.

On the advantages and method of watering the tops of fruit trees.

THE leaves of trees are very essential to their fertility, they attract from the atmosphere, imbibe moisture, and perspire away or cast off any crude juices which the tree rejects, and otherwise assist it. They are so far necessary, that when a tree in a flourishing condition is divested of them, the loss is soon discovered in the check which it thereby receives. The removal of the leaves is also very injurious to those buds situated at their bases, as it prevents them from coming to a proper state of maturity, but the retaining of them very materially assists in getting them properly ripened. Food is also conveyed to the support of the tree through the pores of the wood, particularly the young shoots, they being composed of a number of fine vessels.

As it is very evident that the parts of the tree here treated of are very essential ones by which support is administered to it. Watering the top contributes very much towards it, for the vegetable nutriment which is contained in the water, is by these vehicles con-

veyed to it, and afterwards distributed to every part.

Watering the tops of fruit trees immediately after the blossoms cast their petals is very condusive to the securing of fruit, for without watering at that time, when the weather is dry, not one quarter of the fruit which sets will stand, nor half so much as when the trees are watered as directed.

The water suitable for this purpose must be pure soft water, if this cannot conveniently be had, and water from a well must be used, let it be exposed to the atmosphere for a few days previous to using it; also cast into it a few spades full of earth or quick lime. Soap suds are very beneficial when sprinkled upon the trees, being destructive to insects, for they do not like the strong scent which soap suds leave after being applied. Soap suds are also strong promoters of vegetation, the ingredients of which the soap is composed, appearing to be agreeable to the constitution of most trees.

The method I pursue in applying the water is this: for the first year after young trees are planted, I sprinkle them over with soft water by means of a garden engine three or four times a week, doing it early in the morning before the sun is full upon them; I continue this as long as there is any reason to apprehend injury from frost, I then give it in the evening, just before the sun leaves

the trees, and I continue to give it at this time of the day until the trees cease growing for that year, when it is desisted from.

In watering those trees that are in a bearing condition, I pursue the following method. If the weather be not wet, just before the bloom buds open, the tree must have a good washing with soap suds, (it is very serviceable to have a cistern to receive them at the wash-house, that they may be preserved for use,) this washing of the trees must be performed in the early part of a day that is not frosty; this softens the coats of the buds, and is also destructive to those insects which are then beginning to move about the tree*. The trees must not be watered again until the petals have fallen, as already described in this Chapter; for when they are washed during the time that the bloom is expanding and previous to the fruit being set, it washes away the farina from the stamina, and thus fecundation is prevented, and the florets will be barren, consequently there will be a less crop of fruit. This is very frequently the case when there happens heavy showers of rain at the blooming season, particularly in standard and espalier trees: I have seen trees that have been well supplied with strong healthy blossom, rendered nearly barren that season

* Apply water three times, and soap suds once.

by a heavy shower of rain falling at that time.

Immediately after the fruit is set, watering must be resumed, and be continued twice or three times a week until the fruit is beginning to stone, during which operation, the trees must not be watered more than half of what had been practised before, and very little water must be applied at each time.

When the fruit begins to swell after stoning, water the trees once or twice every week until the fruit is three parts grown, when it must be given up.

The time of watering them must be regulated in the following manner; whilst any danger is apprehended from frost, they must be washed in a morning before the sun acts freely upon the trees, but afterwards in the afternoon about an hour before the sun declines from them*.

After the fruit is gathered, the trees may be occasionally washed over with soap suds, as it is always beneficial to them, and destructive to insects. Whenever this is done in the winter season, let it be on a mild day, and also on the early part of it. In permitting the water to proceed out of the engine upon the trees during the time that the fruit is in an infant state, let the finger

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* When the fruit is ripening, as little water as possible ought to be given to the tops of the trees, because it makes the fruit insipid.

be placed over the end of the pipe, so that it falls upon them like fine rain; for when it is allowed to fall with too much force upon the young fruit, it will sometimes beat it off, or injure it.

Espalier trees should be watered as frequently over the tops as is directed to be done to their roots.

I have occasionally had recourse to sprinkle water over the tops of the trees early in the morning in spring after a frosty night, in order to counteract its effects upon the bloom or young fruit. *(See protecting the bloom of fruit trees.)*

When there is not a sufficiency of soap suds from the wash-house for the purposes desired, a proper mixture may be made in the following manner. To twelve gallons of boiling water, add half a pound of soft soap and stir it up until the soap is well dissolved in the water, which when cool is fit for use. If when the fruit is arrived at a mature state, there should be a necessity of applying a good washing to the trees in order to extirpate insects, (see red spider) on no account apply soap suds at that time, because it always gives the fruit a disagreeable flavour, and clean water will answer the purpose equally as well.

CHAPTER XI.

Nailing fruit trees.

THE securing of wall trees requires considerable attention, not only as it respects the beauty, but the health of them; for when it is performed in a careless manner, the trees are liable to sustain injury. Various are the methods practised in accomplishing this part of our work; but I prefer the old method of securing them by nails and shreds, as being far superior to any other I have yet seen. For some of them completely destroy the beauty and regularity of the tree; but by the old method the tree can be brought to any desired form, and every shoot be trained in its proper place. One of the methods alluded to is, to have a wood trellis which will completely cover the wall, to which the trees are fastened; if the trellis be fixed close to the wall, they are nailed to it; but if at a distance from it, they are tied by matting or otherwise. Both are objectionable, the former because behind the trellis there is an harbour for insects, and the latter in addition to that, prevents the trees from coming in close contact with the wall, and thereby deprives them of the benefit they would receive

from the reflection of the sun. Both are alike objectionable, in addition to the reasons already assigned, because they are expensive in the erection and keeping them in repair.

When a wall is built of stone, and the joints are far apart, a trellis fixed close to it might assist the better regulating of the branches, it having a more ready means of securing them. But if a trellis is designed, one made of small wire stretched from the top to the bottom of the wall, with two or three cross pieces in order to keep the upright wires steady and in their proper places, is far preferable to a trellis made of wood; the wire must be painted, otherwise the rust formed upon it would be injurious to the trees.

The sort of nails proper for use in pursuing the old method is, those made of wrought iron with square heads, and about one inch long; stronger nails than those are requisite for securing large branches. Some persons use cast iron nails, instead of wrought iron ones, with a view of saving expense; but they are generally dearer in the end, as they will not admit of being straightened or pointed like the other, and they are also very apt to break in the act of driving them into the wall, the shoots also are frequently injured by the slipping of the hammer. But whether the nails be of wrought iron or cast metal, they ought not to have sharp edges

or corners, as the young wood is frequently damaged by rubbing against them, which will happen by the wind blowing them about before they are laid in.

When nails are to be used a second time, they should be straightened, and afterwards boiled for an hour or two, or heated in an oven, in order to destroy the larvæ of insects.

Shreds of woollen are the most suitable for use, the colour of them is immaterial; but I prefer dark coloured ones, as having the best appearance. The length and breadth of them must be regulated according to the branches to be secured, they should never be broader than is absolutely necessary, and they must be as long as will allow plenty of room for the branches, which should be so easy as nearly to admit another branch of the same size as the one secured; they should also be folded up a little at each end, so that in driving the nail through the shred, it will have to go through four thicknesses of cloth. For when through two only, if the branch be strong it very soon tears out, but this will seldom be the case when folded up as directed.

Never use more nails and shreds than are absolutely required, as a great quantity does not look well, and is injurious.

Always take care to place the shreds between the buds along the branches, and alternately on each side of the branch; unless

a branch be so crooked, that it will not do without two upon one side before an opposite one is placed. In driving the nails into the wall, always let them incline with their heads down towards the earth, as the wet from nails is injurious to the trees.

Care must be taken in nailing the trees, to keep the branches close to the wall, particularly the larger ones, because they naturally incline from the wall, and when they are not well secured, this will generally be the case; and if allowed to remain at a distance from it one year, it will be with difficulty they can be got to their proper place again, without having recourse to something stronger than nails and shreds. Whenever this is rendered necessary, an iron inclosure must be used for the purpose, having it painted previous to using: the following is the description of it, and also in fixing it to the wall. It is formed with an half circle to come upon the branch, and at each end is an horizontal piece about one inch, or a little more in length, in which is a hole. The diameter of the half circle must be proportioned to the branch to be secured, taking care that it is half an inch or upwards wider on each side. Two screws being made, are driven into the wall, one on each side of the branch, upon which the circular part is placed and secured down, by two nuts. A piece of woollen cloth is placed betwixt the branch,

and that part of the iron which presses upon it. When the branch swells and increases in size the nuts must be loosened so as to allow a little more space.

Instead of securing the strong branches agreeably to the method directed, I have observed it to be done in the following manner. Strong irons with a hook at the top were driven into the wall, so far that the hook brought the branch to its proper place, at which it would keep it afterwards. But this practice is very objectionable, because when the iron hook is allowed to remain for two or three years before it is removed, the branch in swelling frequently grows over a part of the iron, which always causes the tree to canker in that place; and sometimes so much as to destroy that part of the branch above it. This might be avoided by drawing the iron a little out at the winter nailing of the trees and then again at midsummer, but this is very troublesome and is not near so good a mode of securing the strong branches as that recommended above.

Every wall tree ought to be loosened from the wall at the winter pruning, and the wall should then be swept clean and coloured if required; the tree also should be anointed with composition if necessary. The re-nailing of the trees must be performed as soon as possible after they are pruned, anointed, &c.

in order to preserve them from injury by the wind blowing about the shoots, which rubs off or breaks the buds, also from sustaining damage by snow breaking the shoots. It is the practice of some persons to allow their trees to remain loose until spring, but it is a bad one, for there is not any benefit derived from it, but on the contrary they are exposed to the injuries described.

In fixing a tree to the wall that is trained fan way, always place all the strong arms first regularly in their proper direction, when this is done proceed to nail in the younger wood by beginning with the lowest main branch on one side, and then go on regularly round to the other side. In nailing in the young wood, always begin at the end of the branch, and dispose of them regularly along it up to the stem of the tree.

Whenever shreds are to be used which have previously been applied to the purpose, let them be tried well by pulling to see if they are strong enough; such as are found to do, must be boiled for half an hour in soap suds and urine, in order to destroy the larvæ of insects which were deposited in them; after being dried they may be used with safety. But if they had been used again without this precaution, the larvæ of insects which were in them would have been retained. And when come to such perfection as to be able to commit their ravages the ensuing

summer it will require infinitely more trouble and expense to destroy them at that time, besides the injury the tree sustains from their depredations before they can be entirely destroyed.

CHAPTER XII.

The method of applying Compositions for the destruction of Insects, and counteracting the effects of those diseases to which fruit trees are subject, with remarks on its effects and advantages.

THE application of a composition for the destruction of insects, is a practice which I have adopted for many years upon the fruit trees under my care. To it in a great degree I attribute the health of the trees, and they scarcely ever are attacked with what is termed blight, which I believe is in a considerable measure prevented by the effects of the composition, for the quality of the ingredients composing the liquid which is applied, promotes the health of the trees, as well as the destruction of insects. Because it enters the tree through the pores of the wood, and is afterwards transmitted to the various parts of it, which is conducive to the strengthening of the young wood, and by applying it at the season of the year hereafter directed, the buds are considerably improved in health and boldness.

It is a well known fact that insects will lodge and deposit their larvæ in various parts of wall trees, or in holes in the wall during

the winter season; if such survive the effects of frost and severe weather, and are not otherwise destroyed before spring, they then issue forth, increase very rapidly, and in such numbers that they commit very extensive injury; and it is sometimes with great difficulty that they can be destroyed, and not without a deal of trouble and expense, as well as considerable damage done to the trees in effecting their destruction. For when the trees are infested during the time that the wood is young and tender, the means which are then obliged to be employed in order to suppress the insects frequently destroy or damage the foliage, and sometimes the young wood, to the great injury of the tree, when in many instances it might have been avoided.

In order to avoid such bad effects I have recourse to the following practice. I always have the wall trees entirely loosened from the wall every year at the winter pruning, and the wall and tree swept clean with a common hand brush; such of the walls as have been coloured by paint, coal tar, or other means, must have all the places which are made bare by pulling out nails, &c. re-coloured previously to anointing the tree with composition; but whether the wall be coloured or not after it is swept clean, let it be well washed with urine, applying it with a brush, being careful that as little as pos-

sible fall on the trees, because it is injurious to them, but it will be destructive to insects and their larvæ which may be deposited in the walls*; after this is done the trees may be anointed with the composition. *(The directions for making the composition proper for each kind of fruit tree will be found at the end of this work.)* The composition must be laid on with a brush, such as is generally termed a painter's dusting brush. In laying on the wash, always be careful to draw the brush up the shoot, for by doing the contrary way the buds are apt to be damaged. Let it be well rubbed into all the joints, as the insects or larvæ are generally deposited there. The composition must be in a tepid state, what is commonly termed new milk warm, as the ingredients are then in a fermenting state, and the effects it produces are more powerful when in that condition. To preserve the temperature of the composition, let only one pint be carried to the wall to be applied at once, and let an earthen pot be used for the purpose, as earthen vessels retain heat much better than those made of tin or other metal.

Espalier trees may be anointed with the same success as wall trees; I also find it highly beneficial to apply it to standard

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* All loose rough bark must be pared off, and after the application of the composition, a new bark will be formed.

trees as far as it can be done. Its effects in all kinds of fruit trees are not only apparent in the destruction of insects, but it also clears the trees of lichen, and prevents its reproduction. This very materially contributes to the health of them, for when trees are covered with it, the pores of the wood in those places are closed, which always renders a tree unhealthy.

I do not find it necessary to use the composition every year, for when the trees have not been infested by insects during the preceding summer, nor subject to lichen or moss, I omit it for that year, but do not fail to apply it the year following. The expense of the composition is very trifling, a large tree when entirely washed over will not cost more than threepence.

CHAPTER XIII.

Protecting the bloom of wall trees.

VARIOUS are the means employed to preserve the bloom of fruit trees from the injurious effects of frost and severe cold winds, a great many of these contrivances do a deal more harm than good. Amongst the number of practises are the following: some persons use branches of fir, yew, fern, or broom, by fastening them to the walls or branches of the tree so as to cover the bloom, and thus protect it; but a great deal of blossom is apt to be brushed off by them, when the wind blows them about. Besides when put on so thick as to be able to protect the bloom from frost, it is generally too thick to admit a suitable portion of light and air to it, and for want of it the bloom or young fruit frequently withers and drops off; the young wood too is always much weaker. It is also very difficult and troublesome to get new branches every year, which require a good deal of time and care in fixing them against the trees, and likewise in taking them down again.

If one of the above kinds of covering is to be used, broom is a great deal preferable to

any of the others. Previously to fixing it up against the trees, it should be soaked for twenty-four hours in soap suds and urine, and then be dried previous to using. This process ought always to be practised upon any of the other sorts of branches described, for it destroys the insects or their larvæ which may be deposited in them.

A large coping, so as to project a foot or eighteen inches over each side of the wall, is thought by some persons to be a very excellent preservative of bloom. I do not consider this to be a good plan, particularly when they are fixed copings, for they prevent the gentle dews from falling upon the trees; and when they are temporary copings, they are expensive in the forming and erecting, and after all they do not fully answer the purpose; for they are only a defence against the frost which falls in still weather; but when there is a keen frosty wind they are of very little service, and it is then that they are most required.

Others use screens of canvass or bunting, which I think are also objectionable, and more so when they are fixed covers, for the season, they then exclude a great proportion of light and air which are so very essentially necessary to the prosperity of the tree and bloom, or young fruit. And when such screens are moveable, (that is fixed by rollers and other means in order to fold them

up during the day, and to admit of their being drawn over the trees at night,) they are expensive in the erection, and keeping in repair, and they also cause a good deal of trouble in letting down and drawing up. They are also objectionable for another reason; when the covers have been drawn over the trees during the night, they will generally be damp, and when folded up in this state they speedily rot, and to allow them to remain stretched over the trees until the covers are dry, would be injurious to the bloom or young fruit, as a considerable degree of heat would be collected underneath the covers by that time, and when removed away, the sudden admission to the cold air injures them, besides the best part of the day (in reference to the trees) would thus be lost.

The sort of protection I adopt and strongly recommend as a great deal more beneficial and durable, also considerably cheaper in the end than the before-mentioned covers is, woollen nets, which may be purchased at a low rate of the original inventor at Yeadon, near Leeds, Yorkshire; or of Messrs. Backhouse, Nurserymen, York; and also in some parts of Lancashire. This netting completely preserves the bloom, as the frieze which is upon it receives the hoar frost, and as it dissolves in the morning, a suitable portion of light and air is afforded to the trees: it also

repels the force of cold winds and is an effectual protection.

The plan I pursue in fixing up the nets over the trees is, to keep them at some distance from the wall, for when they are allowed to hang down against the trees, the nets being blown about by the wind frequently rub off the buds or otherwise injure them. To prevent this I get some slender poles, of such a length that they will reach from the underside of the coping down into the ground at four feet from the wall, the bottom of the pole may either be fixed into a small stone sunk into the border a few inches deep, or be sunk into the border without a stone, having that part of the pole which is buried in the ground previously dipped in pitch in order to preserve it from rotting; but the former method is preferable. The poles are placed at six feet apart from each other. Care is also taken that there be no sharp edges or splinters upon them, for when there are, the nets are frequently entangled and chafed so as to damage them considerably. After the poles are fixed, the nets are tied to them, beginning at the top first and regularly stretching them to the bottom, but so as to leave about four inches at the ground entirely open, which admits a suitable current of air to the wall, but not so as to incur any injury to the trees from frost.

The trees which I protect in this manner are those against a south wall, particularly Peach, Nectarine, and Apricot trees, which require such help; because the sun acting for a longer time, and with greater influence in the early part of spring upon this aspect than upon the others, the trees are brought into bloom earlier, (and the earlier in the season the stronger the frosts generally are) than those on the other aspects are, and therefore require a protection. But as those trees on the other aspect do not bloom till later in the spring, when the weather is generally more mild, such a covering may be dispensed with, and other means employed in lieu of it. If there comes a few days of strong frost late in the spring, when such trees are in bloom, and the walls be flued, a little fire heat may be given to prevent any injury from it, or they may be watered early in the morning after a frosty night, as will be hereafter directed.

In placing the nets over those trees which require it, I fix them up, if the weather be severe, a few days before the blossom begins to open, after they have been placed over them for a week or two, most of the bloom will generally be expanded, if the frost be severe at that time so that danger from it is apprehended, (as the stamina and pistillum are very susceptable of injury from frost; consequently when they get damaged before

fecundation has been effected, no fruit need be expected at such blossoms,) and the wall be flued, a little fire heat must be applied. In the application of this, very great care is requisite. The fire should be lighted so early in the afternoon, that the wall may be at a proper degree of heat by seven o'clock at night. That part of the wall above the trellis to be at a proper heat, should be a little more than new milk warm, this will not be injurious to the trees, but will be quite sufficient to preserve the bloom under the nets. At that part of the wall where the trellis is fixed, it may be allowed to be a little hotter; this will indeed always be found the case, in order to get the wall to a proper heat above the trellis. It is a very difficult thing to use fire heat early in spring when there is no covering to the trees, for the degree of heat necessary in such a case to preserve the bloom would be injurious to the wood. I therefore never apply fire heat early in spring without having some covering over the trees. But it may be used for a day or two late in spring without any outward covering, the weather being generally less severe at that time.

When I consider the weather is so temterate that no ill effects from frost or cold winds are likely to be sustained, I remove the nets, always chusing a dry day for the

purpose, that they may not be folded up in a damp state, which would rot them.

Another method I frequently adopt in the preservation of the bloom and young fruit is this; after a frosty night I sprinkle cold water upon the trees by means of a garden engine, doing it early in the morning before the sun acts freely upon the trees. If the day following such a frosty night, be cloudy and very frosty, the watering must then be omitted for that day, otherwise it would be the cause of more injury being sustained. This application of cold water, has a very beneficial effect when done as directed, for it acts as a medium between cold and heat, and by preventing too sudden a transition from those extremes, it very materially preserves the bloom or young fruit. When the trees are in bloom, the water must be sprinkled upon them as fine as dew, which may be effected by placing the finger at the end of the pipe. The necessity of this caution is, that water falling forcibly upon the bloom, would wash off the farina from the stamina, but with care this may be avoided. If the fruit be set, the water may be allowed to proceed with greater force.

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CHAPTER XIV.

The necessity, advantages, and method of thinning fruit.

A JUDICIOUS thinning of fruit is frequently found necessary, not only to increase the size and flavour of those which remain, but also to promote the continual productiveness of the tree. This practice will generally be required, as the tree will mostly set a great deal more fruit than it would properly support without weakening it, and a much greater loss would be sustained by leaving too large a quantity at one time, than by properly thinning every year. For by attending regularly to this management, the continued fruitfulness of the tree will be considerably promoted, so as to have (with the use of the other proper means, such as watering, &c.) a suitable crop of fruit every season. But when a tree is allowed to overbear itself, it generally weakens it so much that there is seldom any fruit the season following, and sometimes it is two or three years before it regains its former vigour. If a tree be permitted to retain all the fruit that sets upon it, it takes a great deal of support which in part ought to have been expended in the production and perfecting

of suitable wood to bear another season; and the fruit will not be so fine, nor the flavour so good; for the finer the fruit the better the flavour providing no other means are resorted to but such as are plainly pointed out by nature. In order to bring fruit to a large size I have used means which have considerably increased the size of the fruit, but the flavour has been rendered insipid by it.

The manner of thinning fruit which I adopt in reference to Peach, Nectarine, or Apricot trees is, always to take them off by means of a pair of small pointed scissors, such as are generally used for the thinning of Grapes, it is a far superior method to that of pinching and pulling them off, for harm is generally done to those that are to remain, by injuring their footstalks, which ought carefully to be avoided. For if the footstalk of the fruit is injured to the middle of it, the fruit is almost certain to drop from the tree; and if it happens to survive such injury, it is always stinted afterwards in its growth, and certain to be of a bad flavour.

Respecting the quantity of fruit each different kind of tree must be allowed to bring to perfection, it will be directed in the article on the treatment of each respectively.

The quantity recommended to be retained in the articles alluded to is calculated for a tree in a vigorous bearing condition, but

when a tree is in a weakly state, less fruit must be kept upon it. And if in too vigorous a state, more, so that it must be regulated in each, according to the health of the tree.

Fruit to be properly thinned, require that it should be done at two different times. If a tree has not a great deal more fruit than it is proper for it to bear, let half the quantity required to be taken off be removed the first thinning, which should be when the fruit is about the size of a large marrow pea, and the remainder must not be taken away until the fruit is stoned. The necessity of attending to those directions is, that at the time when the fruit is stoning many generally drop off, more or less in quantity according to the treatment of the trees; *(See watering the roots of fruit trees)* but by reserving and using proper caution in the first thinning, there will remain more than is wanted after the stoning is over, and such can be taken away agreeably to directions. The necessity also of taking a portion off at an early stage of their growth as already described is, that if all were left till after the stoning, the great abundance would cause a greater quantity to drop off in proportion; because fruit will fall off the tree at the time of stoning, for want of nourishment as well as by too great a portion of it. And the greater quantity of fruit to support, the less is the portion of food each receives, and the

effects already stated are the result. Also to regulate the quantity of fruit at the first time of thinning in the proportion it is designed to have it remain for the season, (as is the practice of some persons,) is objectionable; because when only a suitable quantity for the tree to mature is left, and any drop off at the time of stoning, a less crop is thus produced than desired, or is requisite; but by attending to the proper directions, these effects will be avoided.

I should be much inclined to defer the first thinning until after the stoning as it is difficult to estimate what quantity may then fall off the tree — as this falling off might be considered as the first thinning there would be only need of one thinning afterwards

T. H.

CHAPTER XV.

The advantages of thinning the leaves of fruit trees.

THINNING away the leaves of fruit trees is a practice which I have adopted for many years with very great advantage. The kind of trees which I have found it necessary to treat in the manner hereafter described, are Peaches and Nectarines, and occasionally Apricots. The benefits resulting from this are, that by it the fruit is brought to a richer flavour, and the buds are greatly improved in boldness and attaining a proper state of perfection.

This treatment is particularly required in the northern and colder parts of this kingdom, because the general warmth of the climate, even with the assistance of walls, does not afford such a degree of heat as is equal to that of the native country of some of the sorts of fruit trees, consequently as near an approximation as possible to their native temperature must be endeavoured, in order to get the tree and its fruit to a proper state of perfection.

Such of the tender kinds of fruit trees as the general warmth of this country appears congenial to, will certainly require less of

that attention which is so evidently necessary to others. But to all the Peach and Nectarine trees under my care, I find it necessary to thin away a portion of the leaves every summer, but particularly so in wet cloudy seasons. For without it the fruit buds would not have been so matured as to be productive the year following; or if any, only in a very partial manner, and when this happens the wood is apt to get too luxuriant, by the tree not having a suitable crop of fruit to support. I have known instances where trees have been two and three years before they were brought to be properly productive again, which defect originated in not attending to the ripening of the wood. But when such a defect occurs, a less quantity of food must be given to the tree, and the branches be depressed in order to check luxuriancy and promote its fruitfulness.

Great care is required in thinning the leaves both as to the time and manner of performing this operation, because the leaves of a tree are very essential to its support, as well as the sustaining and perfecting of the fruit which it produces. For, take away the leaves from a shoot before it has arrived near to a state of maturity, and such shoot receives a very great check, and the buds will be unproductive and will throw out only wood the next year. Also take away the leaves from a shoot that has fruit upon

it, and such fruit will not come to a proper state of perfection, but will be small and insipid. Therefore to take away the leaves in an indiscriminate manner at an early stage of their growth, would effect a great stagnation in the tree, and be injurious both to the wood and fruit, and the tree would be as unproductive the next year as in the case before cited. But by attending to the following instructions such a disappointment will be avoided, and on the other hand, the tree will be greatly benefitted.

In taking off the leaves in order to effect the ripening of the wood, I commence it as soon as I have gathered the fruit, (and occasionally if the season be late, before this is entirely done) I consider that by that time, the leaves have performed the greater part of their office to the wood, which has generally done growing in length and is only then employed in acquiring maturity, and by cutting away a part of the leaves it greatly promotes that, by admitting a greater portion of sun and air to it. I thin away the leaves at two different times, the first time as already directed, and the second about a fortnight afterwards. At the first dressing I cut about half the leaves, but not entirely away, only about half of each leaf so cut; by this means a suitable portion of light and air is admitted, and those buds situate at the base of the leaves which are cut, are not en-

tirely deprived of the assistance required by them. The other half of the leaves must be cut off in the same manner, about ten days or a fortnight afterwards, as before directed.

When the summer is a very favourable one, and the wood gets ripe in good time, I dispense with the practice described; but have found it necessary for the last twenty-five years, with the exception of three or four summers. It will not either be so requisite in the southern and warmer parts of this country, as in the colder ones; but when found necessary in any situation, the practice has a very beneficial effect.

Also when the fruit appears not to ripen well, and there is reason to fear a deficiency of flavour, I always pinch off those leaves which overhang it, for the more openly exposed it is to the sun, the richer the flavour and the handsomer the fruit will be. Though this practice is not generally pursued, yet it is very seviceable when performed.

CHAPTER XVI.

The advantages of mulching fruit trees.

WHAT is generally termed mulching of fruit trees is of very great advantage to them, for in winter it in a great measure preserves the roots from the severity of frost, and in summer keeps them from drought.

This practice is particularly necessary to trees that are newly planted, the new fibres which such trees make for the first year or two, require protection and encouragement; for they being of a tender nature, and generally weakly, are therefore more liable to injury from severe frost and drought. A strong frost always naturally forces the soil upwards, and the deeper the frost penetrates the ground, the higher the soil is forced up at its surface: and when trees that have been newly planted are not mulched, the tender roots of such are generally forced up with the soil; displaced, and sometimes broken from the stronger ones, and they suffer equally as much from a root being torn in pieces, as what they do from a branch: and when the soil comes to thaw, and is dissolved, the tender roots if not damaged and broken, have to strike afresh and establish

themselves again; this is almost certain to be the case when there is a frequent alternation of frost and thaw. The stronger the roots, the less they will suffer; and the more strong roots a tree has, the less is the mischief from the cause described.

I extend the use of this practice further than to newly planted trees; I do it to all Peaches, Nectarines, Apricots, and Vines; the reason for this is, that it protects and encourages those young roots that are nearest to the bole of the tree, which I always endeavour to do. For when a tree comes to be removed, or the roots require cutting in and the border renovated, it is conducive to their future establishment and success, to have young roots so situated, up to which some of the older ones may be pruned away.

The article which I use for mulching with, is either littery manure or old spent bark; this must be laid about six inches thick over the roots, and to newly planted trees the extent of three feet from the bole, but to large established ones five or six feet, when the border will admit of it. If the border be cropped, it must be laid between the plants when convenient.

To newly planted trees the mulch is laid over the roots immediately after they are planted, and remains both summer and winter for the first two or three years, only removing it every year at the end of autumn.

To large established trees as before described, the mulch is applied at the end of November, and removed in May.

The practice here recommended is proper to be adopted to fruit trees that are planted in borders as directed by me; *(see formation of fruit tree borders)* but where the trees are very differently situated, such as being planted in a wet soil, unless the borders are of a very good slope they should not be mulched during winter, for the mulching of level borders, which are of a wet nature, in winter, is injurious to the trees, because the mulch has a tendency to retain moisture, which when too great, rots the tender fibres and causes a diseased tree. But as borders of this description are very liable to crack during hot dry summers, it is advantageous in such seasons to have recourse to the practice of mulching; which prevents the soil from cracking, and the roots thereby escape the damage which they would otherwise sustain. For when the soil cracks considerably, many of the roots are generally broken by it, or stretched to such a degree as to be very injurious to them. I have seen many trees that have very materially suffered in the manner described; the effects of which soon became apparent in the upper part of the tree, by its being weakly and diseased; particularly in trees of the stone fruit kind.

When littery manure is used as mulch, after it is spread over the roots, a few spades full of earth, or a few stones may be placed upon it, in order to prevent the wind from blowing it away.

The practice described may appear tedious, but it is certain to repay for the trouble, and one person may do fifty trees in one day; therefore the expense is very trifling in laying on the mulch, and the manure is fit for other purposes when removed from the trees.

CHAPTER XVII.

The treatment of sickly fruit trees in order to bring them to a healthy fruitful condition.

It will occasionally happen, that although the border has been properly prepared, and the trees previous to planting have appeared healthy, and were pruned, planted, &c. agreeably to directions given, yet through some inherent disease, a tree may after a year or two become sickly; in this case the leaves will be yellowish, and the wood very weak. I have observed trees remain in this state for several years after planting, and then to recover; but in those cases I was persuaded that the disease was not inherent, only an accidental one, arising from some defect in planting.

But when a tree appears thus affected, let some hogs dung and cows dung, in equal quantities, be put into a tub, and some soft water poured upon them; after these have remained together for several days, some of the water may be drained off, and poured over the roots of the tree.

This application of manure water must not be commenced earlier in the season than when the tree begins to push, when if the

soil is not very moist, a little may be given; but if the soil be in a very moist condition, some of the dung of both sorts may be spread over the roots about one inch thick. If the tree was mulched, this dung may be laid upon the mulch, and thus the benefit of the dung will be conveyed to the tree, by the rain filtering through it.

During summer, whenever the soil becomes dry, some more of the water may be applied, and this must be repeated, when required.

If the soil in which the tree is planted be a stiff cold one, let some pigeon or fowl's dung be soaked as directed for the other, and in dry weather let some of the water be poured over the roots. If the summer be a wet one, some pigeon or fowl's dung must be spread over the roots agreeably to the directions for the hog and cow dung.

Whilst attention is paid to the roots, let the top of the tree be sprinkled over with soft water every day, or at least every other day, doing it early in the morning while danger is apprehended, from frosty nights, succeeded by sunny mornings, and afterwards about an hour before the sun leaves the tree in the afternoon. The branches of the tree must also be trained as erect as possible, so as to avoid crowding them.

During winter, the trees should be mulched whether planted in a suitable soil, or in

a wet one; and a large board should be laid over the roots upon the mulch, in an inclining direction from the trees in order to protect the roots as much as possible from heavy drenching rains, which at that time would be injurious to such trees.

In addition to this treatment of trees that are planted in a wet soil, if the border has not been sufficiently drained, this should be done as soon as possible. *(See proper directions for formation of fruit tree borders.)* And if the border was properly drained, some well rotted tanner's bark, gravel, &c. must be trenched in that part of the border into which the roots have not struck.

If the instructions given be attended to for two years, and the tree does not recover in that time, it is the best plan to take it away and replace it by another. But unless the tree is affected by an incurable disease: the attending to the practice directed, will be successful.

A tree will sometimes be weakly and stinted in its growth for several years after planting, by it having been planted in a careless and improper manner; this I have frequently found to be the case with those trees, that previous to being planted in the border, had grown in pots, the roots of which being thus confined, generally run round the side of the pot, and become matted together. These when planted, having been allowed to

remain in the same direction, the weakly state of the tree was the consequence. *(For proper directions in planting fruit trees see Chapter V.)* If any such negligence has been permitted, the tree ought to be taken up and replanted in a proper manner, by placing the roots in a straight and outward direction.

In some instances a tree may be weakly and diseased from having the roots bruised and damaged at the time of taking up and planting, and not being pruned away in the manner they should have been. When this is suspected to be the case, it is advisable to take up the tree and examine the roots, and prune any diseased parts away; afterwards it may be replanted. But if attention be given to watering the tree with manure water, it will rarely be required to take it up as here directed.

When a tree has been planted several years, extends considerably, and has been trained and pruned properly, if it should produce plenty of bloom but no fruit, (*see Chapter on the Pear*) it is very evident that there is some defect either in the soil or situation, but this will frequently be caused by the soil being too cold and wet. If such a soil is in a good state of fertility from having a suitable portion of manure in it, the best remedy in such a case is, to mix, as far as it can possibly be done, some coarse

sand or gravel, and well rotted tanner's bark in the border; and if it has not been properly supplied with drains, this must be also done, and the surface of the border made to slope from the trees. If the soil be cold and wet, also poor; it must then in addition to draining, if required, have a good portion of well rotted horse dung and half rotted tanner's bark, with a little of either sand or gravel trenched into it. In case a general trenching should be injurious to the roots, manure water from the drainings of the dunghill may be poured over the roots in the spring and summer, in that part of the border not disturbed.

A tree that has been planted in a suitable light soil may also be in a defective state as before alluded to, through the soil becoming poor; an application of strong manure water should be given to the border occasionally, which by enriching it, will frequently render the tree productive. In wet weather, during spring or summer, some manure may be spread upon the border, the strength of which will be conveyed to the roots by the rain.

A tree will sometimes be barren from being in an unfavourable situation, and the buds thereby not receiving a suitable portion of sun, do not come to a fruitful state, consequently the bloom will be defective. (*See Chapter on Pear.*) The tree ought in

this case to be removed to a warmer aspect, that the buds may get matured, and be brought to a bearing state.

A tree may be in a weakly condition from having the branches infested with moss or lichen, and thereby being deprived of proper support: this must be immediately cleaned off with a brush and soap suds, after which it will flourish and do well.

Trees of a weakly condition, when pruned, must have the wood cut in shorter than what will be directed in this work to be practised on healthy trees. If it be a tree which principally bears upon spurs, as the Apple, the spurs must also be kept shorter until it attains a proper degree of strength.

Trees that are weakly will always be benefitted by training the branches as erect as possible, and when they have acquired a sufficient degree of strength, they may then be trained more horizontally.

CHAPTER XVIII.

The treatment of vigorous fruit trees.

It frequently happens, that a young tree will grow very vigorous for a few years after being planted. When this is the case, as great a portion of wood must be retained as can be allowed, so that the influence of the sun is not thereby excluded from operating upon it; for if that was the case, the buds would not be matured, consequently the tree would be kept unfruitful, by which luxuriancy would be encouraged. Besides the retaining of a large portion of wood, the branches must also be depressed, so as in some cases to train them in a pendulous manner*.

If after this practice has been attended to for two years, the tree should continue to be luxuriant and unfruitful, the soil should be taken off the roots near to the bole of the tree, and a strong root should be cut away. In doing this, always cut close up to a lateral root, so that no bare stump remains. *See pruning the roots of fruit trees previous to planting.)* The root which is severed from the

* Manure water must also be withheld.

tree may remain in the border, but cut away an inch or two off the end, where the cut was made. After this is done, the roots must be covered up again, the soil be pressed a little upon them, and afterwards be watered in order to settle it properly.

The best time of performing this operation is the spring, just before the rising of the sap, for the check given thereby to the tree, is greater than when it is done in autumn.

Attention must be paid to obtain ripe fruitful buds as soon as possible, by admitting plenty of sun and air to the wood. *(See thinning away the leaves of fruit trees.)* For when a tree can once be brought to a bearing condition, its luxuriancy is easily checked, and it may afterwards be kept in any state desired.

When none of the methods laid down will effect the desired purpose, I have recourse to the following which never fails when properly performed. It is to take the tree up and replant it, either in the same place, or some other as necessary. I allow the top of the tree to remain without any shortening, except cutting away any damaged parts. The roots are got up as long as possible, and are allowed to remain so, only finishing the end of any broken root by a clean cut, taking care also to get a tolerable ball of earth with them. *(See the taking up and replanting large trees.)*

The reason for allowing the branches to remain at their full length when the tree is replanted is, that when they are cut in, and the tree is planted again, it is nearly as vigorous as before; I have often observed this to be the case; but permitting them to remain as directed, promotes the desired end. This will be very evident by pursuing the instructions given for taking up and replanting the tree. The best time of taking up and replanting is in autumn; they then get properly established before the rising of the sap, and thus are enabled to mature fruit buds the ensuing year.

In pruning trees that are vigorous and luxuriant, the wood should always be left longer in proportion to its luxuriancy, than what is directed to be done to good bearing trees in this work. *(See the treatment of each in its respective place.)*

CHAPTER XIX.

Gathering stone fruit.

HOWEVER trifling the introduction of this subject may appear, there is sufficient importance in it, to warrant some observations; because it is the practice of many persons, to let fruit remain upon the tree as long as it will, even to allow it to drop off, from the idea that the fruit is then in its highest degree of flavour; but this is an erroneous conclusion, for the fact is, that for two or three days previous to dropping off the tree, it is declining in flavour, and in that case it will become more and more tasteless, the longer it is kept before eaten.

The best time at which to gather the fruit, is about three days before it would have fallen from the tree, as it is then in its highest state of perfection. Besides when they are allowed to drop from the tree, although there may be straw or moss for them to fall upon, or nets to catch them in, they are generally bruised, and always are worse for it. And the longer such are kept, the worse they become.

The principal difficulty appears in knowing the time when the fruit is in a proper

state for gathering. It certainly requires observation and practice in order to be fully acquainted with it.

Never pinch a fruit in order to know whether it is ripe or not, particularly the Peach, Nectarine, or Apricot, because they are sooner damaged by it than any other kinds. But to ascertain whether they be ripe or not, let the hand be placed underneath, and the fruit be gently raised a little; if it be at that advanced state proper to be gathered, it will come off immediately, but if not ripe enough, it will adhere: by attending to this, the proper criterion will soon be learned.

A funnel lined with velvet is used by some persons for gathering fruit, but the practice recommended is a great deal better.

CHAPTER XX.

The treatment of the Apple tree trained against a wall, or as an espalier.

ALTHOUGH most kinds of Apple trees will bear well as standards, yet some do better when trained against a wall, or as espaliers. Because they derive advantages from these situations, which they cannot receive as standards; the heat which is afforded them by the reflection of the sun, contributes materially to the ripening of the buds, and bringing the fruit to a higher degree of flavour, and a larger size, than they would be in other circumstances. To have some of the choicest kinds brought to high perfection, is not only profitable, but will certainly yield a considerable degree of pleasure and satisfaction.

There are some sorts of Apples more particularly suited for walls and espaliers, such as the Golden Pippin, Ribstone Pippin, &c.

The sort of soil which is most suitable for Apple trees, is a strong loam with a dry bottom; for if the bottom be wet, the trees are generally diseased and affected with canker. (*Directions for making the borders are given in the Chapter on the formation of fruit tree borders, &c.*)

The aspect best suited to Apples planted against a wall is either east or west, they will do well against either, for the bloom does not open so early in the spring as the Plum or Cherry, and is therefore more safe on an east aspect than they are; for by the time that the Apples bloom, the strong frosts are generally over. (*Directions for planting the trees are given in Chapter V.*)

The distance at which to plant the trees apart, must be regulated according to the growth of the sort. A strong growing kind must be twenty-five feet, and one of a less vigorous habit must be twenty feet. This is proper for a wall twelve feet high; against a wall of a less height, they must be set further apart in due proportion. (*See the Chapter on training fruit trees.*) Always plant a maiden tree, and one that has only one upright stem.

In the following instructions, I shall state each year's method of pruning, for such a number of years after the planting of the tree, as appears to me to be fully necessary. The commencement of each year I date from the beginning of winter pruning.

First Year.—Winter Pruning.—The tree must be headed down just before it begins to push. The time will be varied according to the lateness or forwardness of the spring; but it will easily be discovered when the sap is beginning to rise, by the swelling of the buds. When the tree is cut down, let one

foot be placed upon the soil close to the bole, in order to prevent it from being drawn up, by the force which is used in the operation. Care must be taken to have a sharp knife, that the cut be as smooth and even as possible, and in a sloping direction towards the wall; the cut must be made half an inch above the bud which is selected for the leading shoot.

When the tree is headed down, it must be done so, that seven buds remain upon the stem which is left. If the tree be a weak one, let it be pruned down so that three eyes remain; but a strong tree is far the best, and in Apples is very readily procured, as they generally grow vigorously.

After heading down, it must be secured to the wall by a shred and nail, allowing a sufficiency of room in the shred for the wood to swell. The horizontal method of training is preferable to all others for Apple trees against walls.

Summer Pruning.—A tree cut down as directed, and every bud pushing, which will generally be the case, they must all be permitted to grow until they have attained three inches in length, when two of them must be rubbed off, those to be rubbed off are the third and fourth buds counting upwards from the origin of the tree.

The uppermost shoot must be trained straight up the wall for a leading stem, and

the remaining four horizontally along the wall, two on each side the stem of the tree; these must be trained nine inches apart, which distance is the best for the approved treatment of the Apple tree. For, when they are much nearer than this, they exclude the sun and air from operating upon the buds and wood, in such a manner as is required to keep the tree productive. Also by being too close, they afford harbour for insects: nor can remedies be so well applied in order to destroy them. But by having them at the distance of nine inches, every advantage is received from the sun and air, and the trees are more easily kept clear from every thing injurious. The shoots must not be permitted to push too far, without being secured to the wall; for being very brittle, they readily break by the force of the wind.

Do not let the shoots be pinched in the shreds, as it would cause the buds to break prematurely, below the place in which the shoots were thus strangled. And when this occurs it is injurious, by causing those buds to push the first season, which ought not to have done so until the second. If an accident of this kind happen, a shoot well situated nearest to the end of the damaged branch, must be trained forward for a lead; and if more shoots than one were produced by the accident, they must be treated in

every respect as directed for similar shoots, in the instructions laid down for the second year.

When the leading upright shoot has attained about fifteen inches in length, let the end be pinched off, so as to leave it about eleven inches long. This stopping will cause some shoots to be produced from the upper part of the lead which was stopped; it also considerably strengthens the side shoots which are to be the future branches of the tree.

Three of the shoots which proceed from the new wood, and were produced by stopping the lead, must be trained in; the uppermost straight up the wall, and the others, one on each side the stem of the lead.

The stopping of the leading branch as here directed, must not be deferred later than the end of June, or early in July; for when it is done much later than this time, those shoots which push afterwards in that season, do not arrive at a sufficient degree of maturity to withstand the effects of winter, and frequently are destroyed by frost. But if done as early as directed, the wood attains to a proper degree of hardness, so as not to be injured materially by the severest weather.

When it happens that a tree has not done well in the early part of the season, and the upright shoot is not of a suitable length at the proper period for stopping it, it should

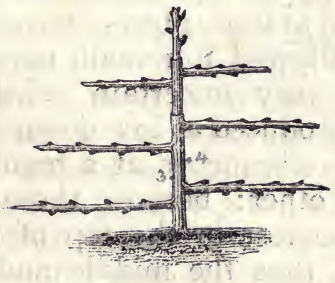
not be meddled with afterwards, until the winter pruning of the tree.

When a tree shoots weakly, the stopping of the upright leading shoot is of great importance to it, as it is thereby strengthened considerably in every part: also when a tree is strong, the stopping produces two new side shoots, and the sap which is expended in them, moderates the vigour of the tree, and luxuriancy is prevented by it.

When a tree grows too vigorous, or too weak, recourse must be had to those remedies of lowering or raising the branches, &c. agreeably to instructions given in each respective Chapter.

Second Year.—Winter Pruning.—At the middle or end of November the tree may be pruned. The upright leading shoot must now be shortened down to ten inches from the place where it was stopped during the last summer. The tree will now be in the state as described by *Fig* 1.

Fig. 1.



The side shoots (but which will hereafter be termed branches) must not be shortened any, but left their entire length.

If during the summer, the end of a branch should have been accidentally broken or damaged, the general consequence resulting from it, would be the production of several shoots, or fruit buds. If shoots, which is very generally the case, were produced, and shortened during summer, agreeably to directions for similar shoots in the treatment of the tree, this second year, they must now be cut down to about half an inch in length, see *Fig.* 2. If instead of shoots, natural fruit buds, should have been produced (these are short and stiff from half an inch to an inch in length) such must not be meddled with, as it is on such, that Apple trees bear fruit.

The advantage of shortening back the upright shoot (which will be hereafter termed the main stem) as much as is directed to be done is, that by it, branches are certain to be produced at those places desired. Whereas if it was allowed to remain much longer, it would be very uncertain whether shoots would be produced as low down as required, so as to have branches at a regular distance from each other: because those buds push that are nearest to the top of the leading shoot, and thus the middle and lower part of it are destitute of branches. And when

branches are required at such a part, but no shoots were produced there, a vacancy occurs, which was caused by improper pruning.

If the leading shoot be cut back agreeably to instructions given, such vacancy will never be occasioned, and the tree will fill up its space as early as required. For it will reach to the top of a wall twelve feet high in seven years; which is as soon as it will be able to do, so as to support every part sufficiently.

The tree must be loosened from the wall, and the wall be swept and washed; also the tree anointed with composition, if required. The old mulch must be taken away, and some new be substituted in its place. These directions must in every future stage of the tree, be carefully attended to every year at the winter pruning: also as to watering the tree both at the roots and top, agreeably to the instructions laid down in the treating of each Chapter respectively.

Summer Pruning.—When the buds upon that part of the main stem which was produced last, have pushed; let them all be rubbed off to the three uppermost. The topmost shoot must be trained straight up the wall for a lead to the main stem; and the other two be trained one on each side.

The instructions already given for stopping the main lead in summer, also in shortening it back, at winter pruning, and rubbing off shoots, must be attended to, until the tree

arrives at a few inches from the coping of the wall, when it will be no longer necessary. The side branches must be allowed to grow without being shortened back at any time, until they have extended as far as can be admitted; when they will require to be pruned in every winter, by shortening the leading shoot back to two or three buds from where it pushed the spring before. When this method has been adopted as long a time as it possibly can be done, the end of the branch must be cut back half a yard or two foot, to a well situated shoot for a supply. Any shoots arising at the forepart of the upright or main stem, must be taken away. If they be very young when discovered, rub them off; but if through neglect they have remained so long as to become woody, let them be cut off close to the bole of the tree: for if they were broken off at such an advanced growth, the bark of the stem which produced them, would be torn. Should a lead be accidentally broken, prune back to a suitable eye or shoot, in order to procure a supply.

The buds upon the wood made last year, will this summer generally make short robust ones, which are the fruitful buds; such must be encouraged, in order to have them properly matured. If, on the contrary, as is sometimes the case, shoots arise instead of fruitful buds, they must be allowed to grow

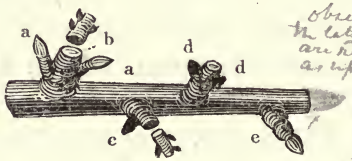
ten or twelve inches long, until the wood attains a little degree of hardness towards the bottom of it, which will generally be the case in June, when they must be cut down to about two inches in length. And at the bottom part of what remains, one or two fruit buds will afterwards be formed, so as to be productive in some cases the next year, but in others, not until the second year: these must be treated agreeably to their condition as will be hereafter directed for such buds and shoots.

Although such a shoot was shortened in June, as directed, yet it will generally push a shoot or more the same season, from the top part of it. After such have grown a suitable length, they must be cut back to about two inches from where they pushed. If more than one shoot were produced after the first shortening, and a bud or two is well swelled at its origin as before described, all the shoots may be left and shortened as directed; but if such a bud does not swell, all the shoots must be cut clean away, to one which may be treated in shortening as directed. The latter practice will generally be found necessary, and also be most advantageous; as a greater portion of sun and air is admitted to the buds, which will be considerably strengthened and forwarded to a mature state.

Third Year.—Winter Pruning.—In pruning

the tree at this time, such of the buds as ran into wood shoots the last year, and were shortened during summer agreeably to instructions given, must now be shortened more. It frequently happens that a fruitful bud, or in some instances two, will have been formed at the lower part of the shoot during the last summer, as *Fig.* 2. a, a; such shoots must now be cut off about a quarter of an inch above the uppermost of those fruitful buds, as b; but as sometimes is the case, if there have not been fruitful buds produced, there will be growing buds, and then the shoot must be cut down so as to leave one bud, as c.

Fig. 2.



On some occasions the growing buds will appear but very indistinctly, and are in an embryo state, yet by close observation they will be easily perceptible. When this is the case, the shoot must be cut down so as to leave two of those embryo buds, as d, d; this will generally be, to leave it about half an inch in length. Upon that part of the branch made the first year after planting of the tree, there will generally be some

natural fruit buds which did not push to shoots, all such must be left entire, as e; they are from half an inch to an inch in length, strong and robust, the end of the buds are of a reddish colour, and is very distinguishable from growing buds, which are considerably less and all of a dark colour.

Summer Pruning.—This summer, the fruitful buds will be productive, when the fruit has swelled a little, a shoot will generally proceed from the stem of the spur (which it may now be so called) just underneath the fruit; such may be allowed to grow eight or ten inches long, and must then be shortened back to two inches, or so low as to leave three eyes upon it, as *Fig.* 3. a. By the shortening of this, strength is thrown into the fruit, and during summer, two or more fruit buds will generally be produced at the bottom of the shoot thus cut down, as b, b, or otherwise from the lower part of the spur, as c. It sometimes occurs that when the tree is very vigorous, some of the buds b, b, will push into shoots, or occasionally into bloom, during the latter end of summer. If shoots are produced, they must be allowed to grow ten inches long, and then be cut back to two inches. When bloom is produced, it must be immediately cut off close under the blossom.

The shoot which proceeds from the bud, c, *Fig.* 2. must be allowed to grow to twelve

inches in length, and then be cut down to two inches; if it shoot again after this shortening, it must be pruned as directed for similar shoots in the second summer.

The shoots which were pruned as directed last winter, and had embryo buds as d, d, *Fig.* 2. will during this summer have a fruit bud, and in some cases two, formed at their bases. If a shoot pushes, it must be shortened as directed, for the shoots which proceeded from the bud c, *Fig.* 2.

The advantage of cutting back the shoots, &c. agreeably to instructions here given, is, that it will generally cause fruitful buds to be formed near to the origin of the shoots, as *Fig.* 3. b, b, c.

From the time when the blossom expands, until the fruit has attained a good size, it will frequently be observed that many of the leaves will be curled, and clustered together; when this is noticed, the treemust be closely examined, as a small grub will generally be found inclosed in the curl of the leaves; the trees must then be washed with lime water, &c. *(See Caterpillar, in the Chapter on Insects.)*

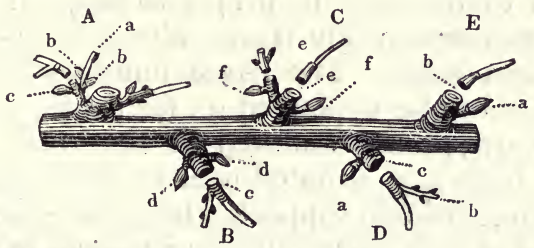
After the fruit has begun to swell, they must be regularly thinned; and where there are two fruit situated together, one must be taken away

During this summer, shoots or fruit buds will be formed on that part of the branch

made the second year after planting, these must be attended to agreeably to the instructions laid down both in winter and summer pruning, for the buds, shoots, and spurs, on that part of a branch made the first year. Such directions also apply to every other year's wood, in the future progress of the tree when at a similar age and condition.

Fourth Year.—Winter Pruning.—The spurs A and B, *Fig.* 3. (which are those that were productive last summer, and upon which a shoot was made and shortened agreeably to direction, *Fig.* 3. a,) must now be regulated. If there be two good fruit buds formed upon the stem of the spur, as d, d, *Fig.* 3. spur B;

Fig. 3.



all that part of it above such buds, must be cut away, about a quarter of an inch above the uppermost, at c. But if there is only one good fruit bud upon the stem, and one upon the shoot which was cut in during

summer, as at a, spur A; then it must be pruned off, as at spur C, e, e, so that the two buds f, f, only remain. When there is only one good fruit bud upon the stem of the spur as the spur D, a, and no fruitful buds at the shoot b, then all the spur must be pruned away just above bud, a, as at c*.

Great care is required in the pruning in of spurs, as the fruitful buds are very brittle and are easily bruised, or rubbed off.

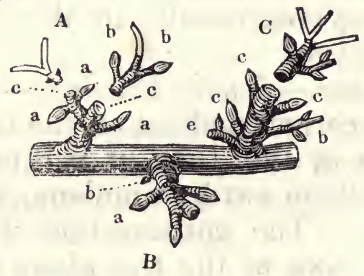
Summer Pruning.—Whatever shoots are produced during summer, upon the spurs, let them be pruned shorter, or be entirely cut out, agreeably to the instructions already given.

Fifth Year.—Winter Pruning.—All the spurs must be allowed to retain three fruitful buds each; but as there will generally be more than would be proper to keep, it will be necessary to thin them, always retaining the best buds. The ripest buds, (which is the most to be depended on for fruitfulness,) are most plump and red at the ends. If such buds are situated near to the origin of the spur which supports them, as spur A, *Fig.* 4. a, a, a, they must be retained, in preference to similar fruitful buds that are nigher the end of the spur, as b, b, when the spur must be cut off at c, c. When there are no

* Sometimes those spurs that bear fruit will not have a shoot produced, but instead of it a fruitful bud, as spur E, a, it must then be pruned off just above such a bud at b.

fruitful buds near to the origin of the spur, those must be left that are further off; but always take care to preserve the bud situated nearest to the branch which supports the spur, whether it be a growing, or a fruitful one, as spur B, a, fruitful bud; b, growing bud. In taking off the buds required, they

Fig. 4.



must be carefully pruned away by a small pointed knife; and all, whether fruitful or growing ones, must be cut clean away, except the one directed to be retained.

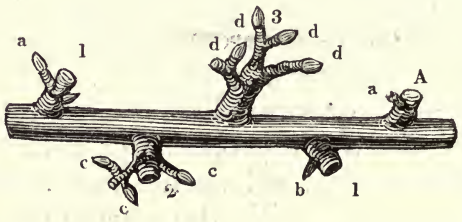
If there be a suitable supply of buds upon the old part of the spur, as spur C, c, c, c, let them be kept in preference to those buds formed at the base of a shoot which has been pruned once or more during summer, as b; for when there is a proper supply on the old part of the spur, all such shoots should be cut clean away, with the exception of one that is situated near to the origin of the spur, as e, when that bud, and the two next

should only be left. It will sometimes happen, that after a tree has borne fruit a year or two, the shoots that push at the ends of the branches, will have a few fruitful buds, as *Fig.* 2. e, formed upon them the first summer; such buds must remain, as they will be productive the season following.

Summer Pruning.—Attention must be paid to this, in shortening the shoots, or thinning them away, agreeably to the instructions already given.

Sixth Year.—Winter Pruning.—In order to convey a correct method of the treatment of the spurs at this time, it will be necessary to point them out by numbers, as *one, two,* and *three.* The enumeration will proceed from the bole of the tree along the branch, as far as the spurs extend upon each separate year's wood; after these spurs are thus numbered, I begin again, and proceed with No. 1. &c. agreeably to *Fig.* 5.

Fig. 5.



Every spur No. 1. on the first year's wood,

must now be cut down to the lowest bud there is upon it, whether it be a fruitful bud, as a, or a growing bud, as b. Every spur No. 2. to have three fruit buds, as c, c, c; and every spur, No. 3. to have four fruit buds, as d, d, d, d.

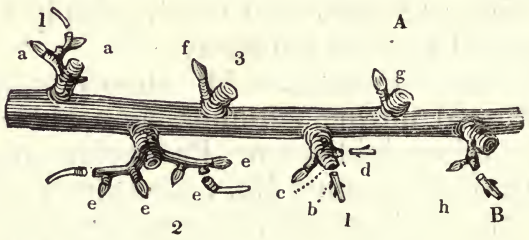
When a spur, No. 1. is destitute of either a fruitful or growing bud towards the lower part of it, such a spur must be cut down so low, as only to leave about half an inch remaining, as *Fig.* 5. A, there is generally an eye or embryo of a bud situate near the origin of the spur, as a, spur A; from this a shoot or a fruitful bud will be produced the ensuing summer, and thus a supply will be obtained for that cut away.

Summer Pruning.—All shoots must be shortened during summer, agreeably to the instructions laid down. Particular care must be paid to the spurs No. 1. as a shoot or fruitful bud will generally be produced nearer to the base of the spur, than to the bud that was left at the winter pruning, and most commonly at the opposite side of the spur. If any spur was cut entirely down as A, *Fig.* 5. and a shoot arises from the part then left, it must also be shortened as the others are; if a natural fruit bud is produced, it must remain undisturbed.

Seventh Year.—Winter Pruning.—The spurs No. 1. will now generally have two fruit buds each, they must be allowed to retain

them as *Fig.* 6. a, a; if instead of a fruitful bud, a shoot pushed and was shortened during summer, as b, and fruitful bud was formed at the lower part of it, the shoot must then be cut off just above it at c; but if there was not a fruitful bud formed, it must be shortened so as to leave it half an inch long as at d. The spurs No. 2. must have four fruit buds left upon each as e, e, e, e. The spurs No. 3. must now be cut down so that only one fruitful or growing bud remains as f.

Fig. 6.



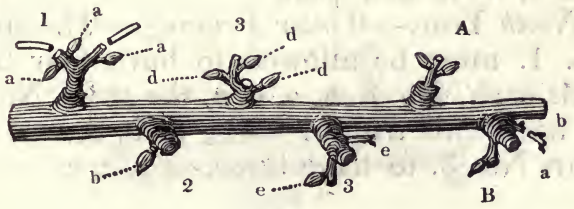
If a fruit bud has been produced from the spur, cut entirely down as represented by spur A, *Fig.* 5. it must be left entire as *Fig.* 6. g, but if a shoot instead of a fruitful bud, it must be cut off just above the lowest bud, whether a fruitful or growing bud, as at h, spur B.

At this time the spurs No. 1. upon that part of the branch made the second year after planting, will require to be cut down to

one fruitful or growing bud, or entirely away as done to those upon the first year's wood. All other spurs upon every year's wood at a similar age and state, must be attended to agreeably to the instructions given for the spurs upon the first year's wood.

Summer Pruning.—This must be attended to as done in every previous year.

Fig. 7.



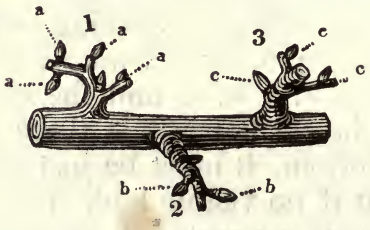
Eight Year.—Winter Pruning.—The spurs, No. 1. must have three fruit buds left upon each, as *Fig.* 7. a, a, a, and the spurs No. 2. must now be cut down. If there be a bud near the bottom, it must be just above it, as *Fig.* 6. but if no visible bud, cut it off so as to leave about a quarter of an inch, as spur A, *Fig.* 5. The spurs No. 3. will now have a new fruitful bud, or a shoot, in addition to that left the last winter pruning, it must now be pruned as d, d, d, for the fruitful bud, and as e, e, for the growing shoot. The spurs A and B, *Fig.* 6. must now be regulated, the spur A, will generally have a second good

fruit bud, which must be left as A, *Fig.* 7. And the spur B, will have made a shoot, at the side of which, a fruit bud is generally formed; if it be near to the bottom of it, let the shoot be shortened just above it, but if the fruitful bud be at the end of the shoot as spur B, *Fig.* 7. a, let the shoot be cut down below it as at b.

Summer Pruning.—This must be performed agreeably to directions for the previous year's, wood and spurs.

Ninth Year.—Winter Pruning.—The spurs No. 1. must be allowed to have four fruit buds each, *Fig.* 8. a, a, a, a, the spurs No. 2. to have two fruitful buds, as b, b, and the spurs No. 3. to have three, as c, c, c,

Fig. 8.

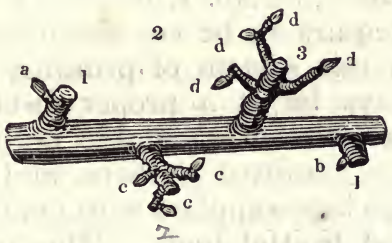


Always leave those buds that are nearest to the origin of each spur. If any spurs were cut entirely down, let such shoots or buds as were afterwards produced, be regulated agreeably to instructions in the eighth and ninth years treatment. *See the Plates.*

Summer Pruning.—This must be performed agreeably to instructions given.

Ninth Year.—Winter Pruning.—The spurs No. 1. must now be cut down. If there be a fruitful or growing bud situated near to the origin of the spur, it must be cut down to that, as *Fig.* 9. a, a fruitful bud, b, a growing bud. The spurs No. 2. must be pruned to three fruit buds, c, c, c, and the spurs No. 3. to have four fruit buds, as d, d, d, d.

Fig. 9.



It will be observed that the spur No. 1. has now been cut down twice, the first time in the sixth year, and the second in the tenth, thus having borne fruit four years. This would be the case with those spurs that were only cut down to a fruitful bud, as *Fig.* 5. a; but if cut down to a growing bud, as b, it would only have borne fruit three years. Also if the spur was cut entirely down, as A, *Fig.* 5. it would have only borne three years. In both the latter cases it would be advisable to leave them with three fruit buds each this winter, and cut them

down the next; unless they should have grown vigorous and long, when they would require it, as directed for those which were cut down to a fruitful bud.

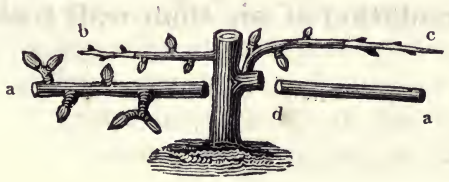
This regular system of cutting down and treating the spurs, must be practised upon all other spurs, as is here directed. Thus the next year the spur No. 3. must be cut down as in *Fig.* 6. f, and then the second year from this time the spurs No. 2. as *Fig.* 7. b; and in the fourth year from the present period, the spur No. 1. cut down as *Fig.* 5. a, will require to be cut down again. By pursuing this system of pruning, the spurs will always be at a proper distance from each other, so that a suitable portion of sun and air is admitted to them, and the spurs are always kept supplied with young healthy wood, and fruitful buds. This renewal of spurs may be practised five or six times, and frequently many times more than that number, and the tree will be well supplied with young fruitful spurs. And thus those long, injurious, straggling spurs which are so generally to be seen, and which so disfigure the tree, are avoided. Although the plan here laid down may appear tedious, yet when it is pursued, it will not be so, and will abundantly compensate for all the trouble and attention required.

After a series of years it will be desirable to have a new set of branches to the tree,

this may be effected either by heading down the tree entirely, and afterwards training up a single shoot and proceeding as with a young tree; or, by training in new shoots in succession from the bole of the tree, or from the branches. This latter method is preferred by many persons, as the tree is thereby kept fruitful every year, whereas in the first method there is a loss of fruit for two or three seasons.

In pursuing the latter plan, the following particulars must be attended to. Four years previous to the time it is designed that the old branches shall be cut away, let shoots be trained in from the bole of the tree if possible, otherwise from the branches. Such as are well situated at the side of a branch, and as near to the bole as can be had, must be chosen. In four years, the first part of the new branch will generally be well supplied with good fruitful spurs and buds, the old branches must then be cut away close to the bole of the tree, or to the origin of the new branch. *See Fig.* 10. a, a, old branches,

Fig. 10.



b, new one from the bole, c, from the branch, d, where pruned to.

The former of these two methods described is that which I prefer, as the trees bear finer fruit and are equally fruitful. When the new head is forming, great attention must be paid to the training of vigorous branches in a pendulous manner, which brings them to a fruitful condition, when they may be trained horizontally afterwards.

Apples trained as Espaliers.

The proper soil and method of planting the tree, &c. is treated upon in the respective Chapters upon each. The branches should be trained at nine inches apart, and the plan of forming the head of the tree must be pursued, that is laid down for wall trees. The method of pruning the spurs on wall trees must also be practised, with this exception, that when a spur has five fruitful buds upon it the winter before it is to be cut down, they may all be permitted to remain. Whereas in wall trees only four are left, but Espaliers will admit of the full number having a more free circulation of air than wall trees.

CHAPTER XXI.

The treatment of the Pear Tree against a Wall.

THE soil most suitable for Pear trees is a good strong loam, and if too retentive of moisture it should have a little gravel or scrapings from a public road mixed with it. The border must be made dry, &c. agreeably to the directions given under that Chapter.

The trees should be planted twenty-five feet apart for a wall twelve feet high, and more or less in proportion to the height of the wall. Maiden plants of one year old are the most proper to be chosen for planting, *(See directions, in taking up, pruning the roots, and planting the tree, under their respective Chapters.)*

The most beneficial mode of training the Pear is the horizontal; the vigorous habit of the tree requires it, in order as early as possible to bring it to a fruitful condition. When it occurs that one trained after this method still continues unfruitful for several years after planting, the branches must be trained in a pendulous manner, and more or less so according to the luxuriancy of the tree, but always commence the training in the hori-

zontal method, and afterwards change the direction of the branches as required.

Pear trees produce their fruit on spurs and buds similar to Apples, but one mode of pruning is not alike suitable to all kinds of Pear trees. I shall therefore first treat of those that require a method of pruning nearly the same as that laid down for Apples.

First Year.—Winter Pruning.—The heading down the trees must be performed in spring, and it must be cut so low as only to leave three buds, (if the plant be vigorous it may be cut to seven buds, and treated in rubbing off buds, &c. as for Apples).

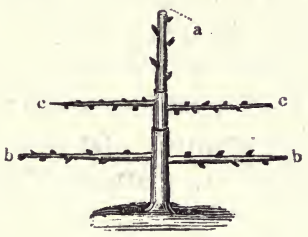
Summer Pruning.—When the shoots have pushed, let them be secured to the wall before they get long, as they are very liable to be broken off by wind or other accidents, and such shoots cannot easily be supplied with others well situated to fill up the vacancies. The uppermost shoot must be trained straight up the wall, and the remaining two, one on each side the bole of the tree. When the upright shoot has advanced about fourteen or sixteen inches, let the top be pinched off so as to leave it ten inches long From the top of this shortened shoot three or four shoots generally push, let the uppermost be trained straight up the wall, the next two one on each side. This stopping of the shoot must not be done later than the latter end of June, or early in

July, for reasons assigned in the treatment of the apple.

The branches must not be shortened at all either in summer or winter pruning of the trees, until they have extended as far as the wall will allow.

Second Year.—Winter Pruning.—The upright shoot or head of the tree must now be cut down to about ten inches from the uppermost branch, as *Fig.* 1. a; b, b, the branches which pushed at spring; c, c, those that were caused to push by the stopping of the leading shoot at midsummer.

Fig. 1.



The tree must be anointed with composition, if required, agreeably to directions in that Chapter.

Summer Pruning.—When the shoots (upon that part of the leading stem which were produced after its being stopped last midsummer,) have attained two inches in length, let the three uppermost be preserved, and all others be rubbed off. Of those three retain-

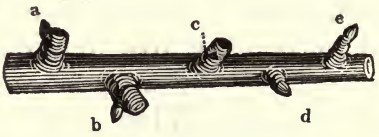
ed, one must be trained straight up the wall, and the other two, one on each side the main stem.

The method now laid down for supplying the tree with branches, must be attended to both in winter and summer pruning, until it reaches its destined height.

Whatever shoots are produced on the branches, they must be allowed to grow until they are twelve or fourteen inches long, and then be pruned back to two inches, this may be repeated, if required.

Third Year.—Winter Pruning.—All the shoots which were produced and shortened during the last summer, must now be pruned down to about half an inch in length, as *Fig.* 2. If on any of the shoots there should be a fruitful bud produced near to the bottom, such must be pruned just above the lowest bud as in *Fig.* 2. a, growing bud, b, fruitful bud.

Fig. 2.



Some kinds of Pear trees come to a productive state earlier than others, but it is rarely the case, that any will be fruitful before the

fourth year after planting, and in some cases, (varying according to the richness and depth of the soil, &c.) not until the fifth, sixth, or seventh year: but as some are fruitful from the fourth year, I shall give instructions for treating such trees from that period. *(See instructions for treating vigorous trees.)*

Summer Pruning.—This must be attended to agreeably to the instructions already given.

Fourth Year.—Winter Pruning.—All the shoots which were produced and shortened during last summer, must now be regulated. Those that have a fruitful bud near to the bottom of them, must be cut off just above each, as b; some of the shoots will sometimes have neither growing or fruitful buds, but have several embryos round their bases, such must be cut down so as to leave about half an inch remaining, as c. It will occasionally happen that there will be small embryo fruitful buds, but which will not arrive at a mature state until the next autumn, as *Fig.* 2. d. These must be allowed to remain in the state they are in, as well as all the fruitful buds e, which are to bear the ensuing summer.

Summer Pruning.—All those spurs that have fruit upon them will generally have a shoot produced, which arises just underneath the fruit, such must be shortened to two inches in length, as well as all other similar

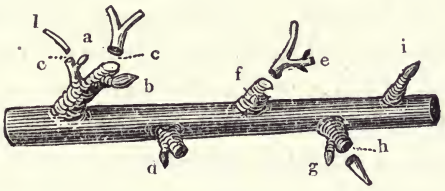
shoots when they have arrived at a proper state to require it. *(See directions already given for this work.)*

It is very general to see healthy Pear trees which produce an abundance of bloom but set a very small proportion of fruit; this is more particularly the case with the tenderest kinds. The reason of such barrenness is in some cases from the stamina being destitute of farina, and in others from the farina having been dispersed before the pistillum had arrived at a proper state for its reception. To remedy such defects, I adopt the following practice. As soon as the florets have expanded and the pistillum is in a proper state of maturity, I impregnate six upon each corymb of blossom. The florets which I choose for this operation are those situated nearest the origin of the spur, for when Pears naturally set it is very generally such florets. The time I choose for this operation is calm dry days, and if possible when the sun is not very hot upon the trees. Immediately after this operation has been performed, I give each tree about eighteen gallons of manure water, or soft pond water, at the roots. The trees should never be washed over the tops for a considerable time after this impregnation has been effected. *(See Chapter on Peach and Nectarine trees.)*

Fifth Year.—Winter Pruning.—The spurs a, and e, *Fig.* 2. will have borne fruit the

last summer, such of the spurs e, a, as had a shoot produced just underneath the fruit, as *Fig.* 3. 1, which were shortened during the summer, will generally have a fruit bud formed at the lower part, as *Fig.* 3. a, and in some cases upon the main stem of the spur, as b. If there be a bud situated as b, and another as d, the spur must be allowed to retain them both and be cut off at c, c. When any of those spurs are destitute of fruitful buds, and have only growing ones, let the spur be cut down to the lowest bud, if situated near the bottom, as d. If the bud be not near the bottom, but as e, the spur must then be cut down to within half an inch of its origin, as f.

Fig. 3.



It will sometimes occur that instead of a shoot proceeding from the spur close underneath the fruit, as *Fig.* 3. No. 1. a fruitful bud will be formed, as g; when this is the case, the spur must be cut off just above such bud, as h.

The spurs, as *Fig.* 2. must be regulated by pruning them at this time down to the lowest

growing bud, to one or two fruitful buds, or cutting them entirely away, agreeably to the instructions given in *Fig.* 3. c, c. The embryo buds *Fig.* 2. d, will now have attained such a state of maturity as to bear fruit the next summer, they must be allowed to remain in the state they are, as i, *Fig.* 3.

Summer Pruning.—This must be attended to by cutting down all shoots to two inches long, which must be repeated, if required.

Sixth Year.—Winter Pruning.—At this time all the spurs as described in *Fig.* 3. must be allowed to retain all the fruit buds there are upon them, and all wood shoots must be cut away in the manner laid down in treating on the fifth year, so as to retain a bud as near to the origin of each spur as possible.

Summer Pruning.—This must be performed agreeably to instructions already given.

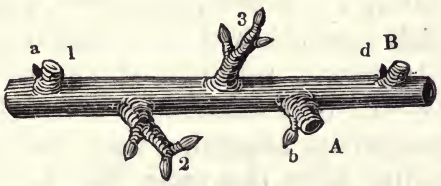
Seventh Year.—Winter Pruning.—In order properly to explain the method of pruning the spurs in regular succession, as is now to be recommended, I shall treat upon them by numbers, one, two, and three, as already done in the directions for pruning Apples, beginning from the bole and proceeding along the branches as far as the wood made the first year, extends.

At this time all the spurs No. 1. must be cut down.

If there be either a growing or fruitful bud about half an inch from the bottom, as

Fig. 4. spur A; a, growing; b, fruitful bud, the spur must be cut off just above such bud. But when there is not a bud situated near the bottom, the spur must be cut down so as to leave about a quarter of an inch as spur B, d. The spurs Nos. 2, and 3, must be allowed to retain three fruit buds each.

Fig. 4.



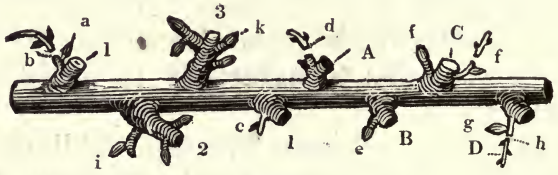
Summer Pruning.—This must be particularly attended to in those shoots which proceed from spurs which were cut entirely down as d, *Fig.* 4. and when they are about twelve inches long let them be cut down to two inches; which may be repeated if necessary, by cutting them off to within two inches of that part of each shoot which was produced since last shortening. The pruning in all shoots made upon the other spurs must be attended to agreeably to directions already given.

Eight Year.—Winter Pruning.—All those shoots that have been produced from the spurs No. 1. which were cut down last winter pruning, *Fig.* 4. d, and have a fruitful bud near to the bottom of each, as *Fig.* 5. a,

must now be shortened down to such bud as b, also, all shoots that have only growing buds must be pruned down to one bud c. It will sometimes happen that a shoot may be destitute of both fruitful and growing buds in a matured state, but there will always be small eyes which are the embryos of future buds, such a shoot must be left about half an inch long, as spur A, d; there will generally be left upon it two eyes, and the uppermost will always make a shoot, whilst the lower one will be formed into a fruitful bud.

It occasionally happens that instead of a shoot arising after the spur No. 1. was cut down, a fruitful bud will be produced, as spur B, e; such must be left entire, and it will be productive next season, and must afterwards be treated agreeably to directions laid down, commencing at *Fig.* 3. and proceeding in its future age and condition through *Figs.* 4, 5, and 6.

Fig. 5.

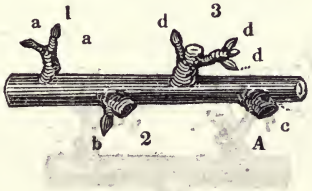


Such of the spurs No. 1. as were not entirely cut down, but to one fruitful bud as

Fig. 4. b, will generally now have two fruitful buds, if so, they must be allowed to keep them, cutting away any shoot that may have pushed and was shortened during the summer, down to such buds, as *Fig.* 5. spur C, f, f. The future treatment of these spurs must be attended to agreeably to the instructions previously laid down. The remainder of the spurs No. 1. cut down last winter pruning to a growing bud, which pushed a shoot and was shortened during summer, will generally have fruitful buds at the lower part of them, as *Fig.* 5. g, the spur must then be cut down to h. The spurs No. 2. must have three fruitful buds left, as *Fig.* 5. i, and the spurs No. 3. four, as k.

Summer Pruning.—This must be regulated as already directed.

Fig. 6.



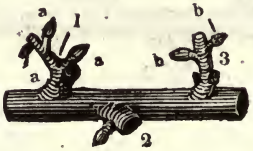
Ninth Year.—Winter Pruning.—The spurs No. 1. must be allowed to retain whatever fruitful buds there may be upon them, and there will generally be two at least, as *Fig.*

6. a, a. The spurs No. 2. must now be cut down to the lowest bud, whether a fruitful or growing bud, if such be situated near to the bottom of the spur, as *Fig.* 6. b, otherwise the spur must be cut down to cause an embryo to push, as in spur A, *Fig.* 6. c. The spurs No. 3. must have three fruit buds, as d, d, d.

Summer Pruning.—Particular attention will be required to those shoots which proceed from the spurs No. 2. cut down at the last winter pruning; these shoots, and all others, must be pruned agreeably to the instructions already given.

Tenth Year.—Winter Pruning.—The spurs No. 1. must now be allowed to have three fruit buds, as *Fig.* 7. a, a, a. The spurs No. 2. to be regulated agreeably to the directions given at *Fig.* 4. a, b, and d. The spurs No. 3. must now be cut down to two fruit buds, as *Fig.* 7. b, b.

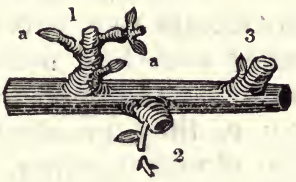
Fig. 7.



Summer Pruning.——To be regulated as before.

Eleventh Year.——Winter Pruning.—The spurs No. 1. must retain four fruitful buds, as *Fig.* 8. a, a. The spurs No. 2. must be regulated agreeably to directions given for the spurs No. 1. when at a similar condition. *See Fig.* 5. And the spurs No. 3. must be cut down to the lowest fruitful or growing bud, or entirely away if required. *(See Fig.* 4. *spurs No.* 1. *or Fig.* 6. *spurs No.* 2. *where instructions are given for cutting away spurs.)*

Fig. 8.



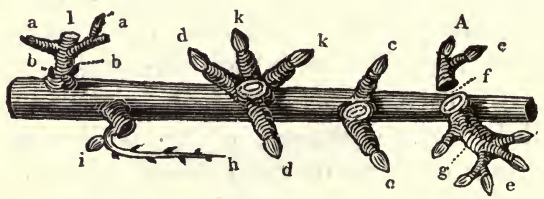
Summer Pruning.—This must be performed agreeably to the instructions given in the previous year's treatment.

Twelfth Year.—Winter Pruning.—The spurs No. 1. must now be cut down to two fruitful buds, as *Fig.* 9. a, a, which will cause an embryo or more, as *Fig.* 9. b, b, either to push the following summer, or to swell considerably, so as certainly to push after the old part of the spur has been pruned away. At the next winter pruning it must be cut down to the lowest fruitful or growing bud, if there be such situated about an inch from the branch which supports the spur; otherwise

the spur must be cut down to about half an inch from its origin, agreeably to the instructions previously given. *(See Fig.* 4. *spurs No.* 1. *and A, B.)*

It will sometimes happen that when one of the spurs is cut down, three or four fruitful buds or shoots will arise around that part which is left, as *Fig.* 9. d, d, k, k; if they are fruitful buds they must all be allowed to remain until the next winter pruning, when they will generally be in the condition described by d, k. In thinning them, all must be taken away except two, which two should be the strongest and best matured; and if they be situated at the opposite side of the old spur, as c, c, they must be preferred to those that are closer together, as k, k, for when that is the case, they interfere and injure each other; when those spurs which

Fig. 9.



remain come to have lateral spurs, as spur A, e, e, one of the main spurs must be cut away; g the spur to be left.

When shoots are produced instead of fruitful buds, as represented by d, d, k, k, they must be pruned down once, or more if required, during summer, and at the winter pruning they must be regulated agreeably to the following directions.

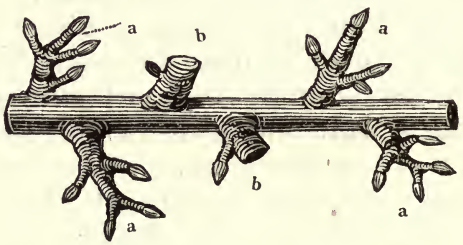
It will frequently be the case that a fruitful bud will be formed at the lower part of such a shoot; if two shoots situated in the manner of the buds c, c, have each a fruitful bud at its base, both of them may be left, but otherwise, only one. If none of the shoots should have a fruitful bud, then two of them situated as before described must be left, and be cut down to the lowest growing bud upon them; and when a shoot pushes the next summer, it must be nailed down in the direction described by h, which will cause it to form a fruit bud at the origin, as i; and at the next winter pruning the shoot must be cut off just above such fruitful bud. This method of nailing down shoots during the summer in order to make them productive of fruitful buds, may be practised upon any part of the tree when circumstances require it.

When the spurs thus cut down and regulated agreeably to directions, have borne fruit a proper length of time, as laid down in the instructions already given, they must then be cut down to the lowest bud, or entirely away as before, and as the case requires;

these instructions must also be attended to in every other spur, upon every part of the tree, at a similar age and state.

The previous instructions are proper to be practised upon those kinds of Pear trees that have their spurs as far distant from each other as Apples have, (such as the St. Germain, Brown Beurre, Burgamots, Swans' Eggs, &c.) but as some sorts as the Crasane, Chammontelle, &c. have their spurs very rank on the branches, a different mode of treatment is necessary. Upon such kinds

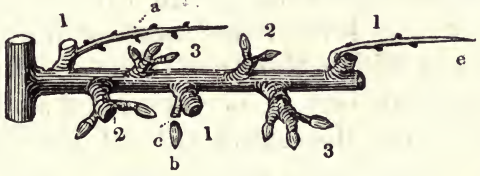
Fig. 10.



two spurs (on the same year's wood) must be kept equally in a bearing condition, and the next two be pruned down to the lowest bud, or entirely away if required, at the same time *see Fig.* 10. a, a, spurs that are bearing, and b, b, spurs that are cut down. The bearing spurs must be allowed to be productive for the same period, and also to retain the same quantity of fruitful buds, as

were directed to be done in the other kinds already treated of as St. Germain, &c. But a different mode of treatment from either of the preceding is required for the successful management of the Jargonelle Pear tree. The tree must be trained horizontally, and be furnished with branches in the same manner as directed for the other kinds in the foregoing observations, only that the main branches must be twelve inches distant from each other, consequently the leading shoot must be pruned long enough for this purpose, which will be effected by leaving it thirteen inches long at each time of stopping.

Fig. 11.



The spurs must be allowed to retain the same quantity of fruit buds, as those kinds already treated upon, and at the proper time they must be cut down in the same manner, in order to produce new ones. At the seventh winter pruning, commencing from the first heading down the tree, the spurs No. 1. on the first year's wood will require to be cut down, either entirely or to the lowest bud,

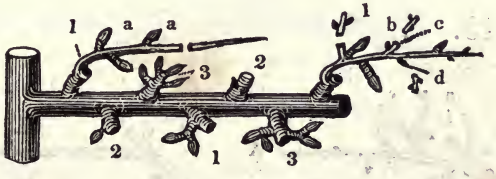
see Fig. 5. During the ensuing summer, a shoot or fruitful bud will generally be produced from the part left. If there arise a shoot upon the first spur from the origin of the branch, as spur 1. a, *Fig.* 12, let it not be shortened during summer, but be carefully trained horizontally on the side of the branch it proceeds from, and in the direction to which it is naturally inclined. If that part of the branch produced the first year after planting, extends two feet six inches in length from the first shoot a, nailed in, another shoot must be trained in at that distance from the first, as e. This shoot must also be one that has proceeded from a spur which was cut down, and must be trained in on the same side of the branch that the other was; a few inches more or less in the distance at which they are to be apart is not very material, but it is very necessary they should be on the same side of the branch. It will sometimes occur that a shoot for training, as a, spur 1. will not be produced the first season after the spur was cut down, but instead of that, a natural fruit bud, as spur 1. b; in this case a supply must be had the second year. This may be procured by cutting off the top of the fruitful bud, as at c; and the shoot which arises must afterwards be treated agreeably to the instructions which apply to its age and condition, and which are laid down in treating of the shoots,

a, e. All the intermediate spurs such as Nos. 2. and 3. must be treated as directed for spurs in the seventh year's pruning, *(see Fig.* 5.*)* and in every succeeding year, the treatment must be pursued which is laid down for them.

Eighth Year.——*Winter Pruning.*——The shoots which were trained in, as a, e, *Fig.* 11. must remain at their entire length.

Summer Pruning.—During this summer, fruitful buds will generally be formed upon that part of those shoots trained in, as a, e, *Fig.* 11. which was produced last year; but it will sometimes happen that a shoot or two will push instead of fruitful buds being formed, such shoots must be pruned back during summer to two inches, once, or more if required, which will cause them to form a fruitful bud at the lower part, as *Fig.* 12. b.

Fig. 12.

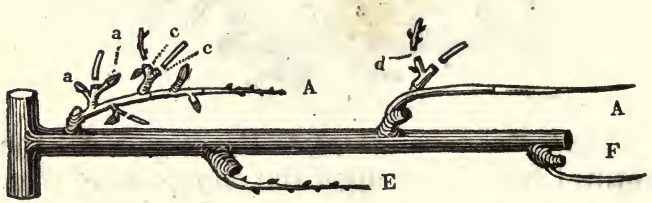


Ninth Year.——*Winter Pruning.*—All the natural fruit buds upon the shoots a, e, *Fig.* 11. must remain entire, as *Fig.* 12. a, a, If any shoots pushed last summer and were shortened, each must now be cut down to

the lowest bud, which will generally be a fruitful one, as b; but if not a fruitful bud cut it down to the lowest growing bud or eye there may be upon it, as c, growing bud, d, eye or embryo of a future bud. At this time the spurs, No. 2. first year's wood will require to be cut down. *(See Fig. 7. spur 2. b, b, b.)*

Summer Pruning.——Whatever shoots are made on the spurs upon the shoots, which are trained in, as *Fig.* 11. a, e, they must be pruned down to two inches as frequently as required. During this summer, one or more shoots must be trained in from that part of the branch produced first year after planting, as done to the shoots a, e, *Fig.* 11. In selecting a shoot for this purpose, one must be chosen that has pushed from a spur, No. 2. which was cut down last winter pruning, and situated as near the middle betwixt the two shoots A, A, *Fig.* 13. as possible; it

Fig. 13.

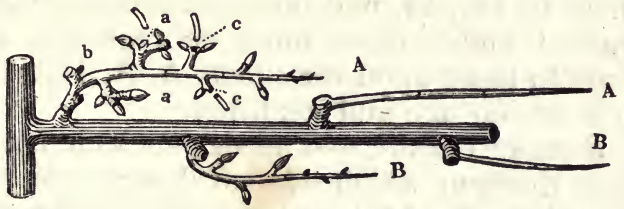


must be trained at the opposite side of the branch to them, as E, F. If that part of

the branch produced first year should extend three feet farther than the shoot E, but which will very rarely be the case; another similar shoot must be trained in on the same side, and at the distance of three feet from the shoot E, as at F.

Tenth Year.—Winter Pruning.—The spurs upon that part of each shoot which were produced the first year after being nailed on as A, A, *Fig.* 13. will now have borne fruit one season, they must be allowed to retain all the fruitful buds there are upon them, there will generally be two or three, as *Fig.* 14. a, a, c, If the shoots (which pushed from the spurs) that were shortened during last summer, should now have a fruitful bud at

Fig. 14.



the bottom of them, they must be cut off just above each bud, as at c, *Fig.* 13. If there should not be a fruitful bud, let such shoots be cut down to half an inch in length. If the shoots A, A, should extend so as to crowd each other, let the end be pruned back so far as

it interferes, at which it must afterwards be kept, by cutting it back to that part every summer and winter pruning.

Summer Pruning.—This must be attended to agreeably to previous instructions.

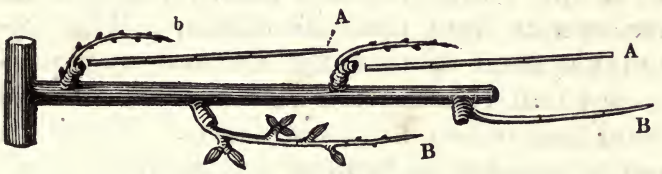
Eleventh Year.—Winter Pruning.—All the spurs upon the shoots A, A, *Fig.* 14. must now be allowed to retain whatever fruitful buds there are upon them, as a, a, with the exception of the first spur upon the shoot, as b, *Fig.* 14. which must now be cut down to the lowest bud, or entirely away, as directed in *Fig.* 5. a, b, d; this is done in order to obtain a new shoot. Those spurs upon that part of the shoot produced the second year after being trained in, as *Fig.* 14. c, c, will generally have two or three fruit buds each, they must all be retained. The shoot B, *Fig.* 14. will now be furnished with fruitful buds; these must be regulated as done to those upon the shoots A, A, *Fig.* 11. at a similar age and condition.

Summer Pruning.—The shoot which arises from the spur which was cut down as represented by *Fig.* 14. b, must not be shortened, but be trained in between the branches, as it will be required to supply the shoot a, *Fig.* 11. when taken away; all other shoots must be shortened as already directed.

Twelfth Year.—Winter Pruning.—The shoots A, A, *Fig.* 15. must now be cut away so far back as to the origin of the shoot b, which

shoot must be trained forward in order to supply the place of the shoot A, cut away. The spurs upon the shoots B, B, *Fig.* 15. will now generally be well supplied with fruitful buds; they must be permitted to retain three

Fig. 15.



each, and next year four each, except the first upon the shoot, which must at that time be cut down in order to produce a new shoot for training in, as were done to the shoots A, A. The spurs which afterwards proceed from those shoots obtained by thus cutting down spurs, must have the same proportion of fruitful buds left upon them at every winter pruning, and also be treated in every other respect as already laid down for the spurs which the preceding shoots supported, as *Figs.* 13, 14, and 15. This practice of cutting back the shoot A, *Fig.* 15. up to the spur b, must be done for the first renewal; but when a new one is desired a second time, the old shoot must be cut so far back as only to leave about half an inch remaining, unless there be a growing or fruitful

bud situated near its origin, when it must in that case be pruned off just above it; and a shoot must be nailed in from some of the intermediate spurs, in order to supply the vacancy caused by the removal of the old shoot. When a new shoot, as *Fig.* 11. a, is desired a third time, it must be cut back to a spur; and when a fourth time, to an embryo or bud near its origin. This regular system of pruning, &c. must be pursued to all shoots trained in at that age and condition, when they require it. When an entire new set of branches is required, this may be obtained by the same method as is directed in the treatment of the Apple tree.

It will sometimes happen amongst those kinds of Pear trees which are spurred and have not shoots trained in as the Jargonelle Pear tree, that some of them may be more inclined to produce wood shoots, than fruitful buds; when this is caused by the luxuriant habit of the tree, some shoots may be trained in agreeably to the method practised upon the Jargonelle, only that the quantity of shoots to be nailed in must be regulated according to the luxuriancy of the tree. This practice has a very beneficial effect in moderating the vigour of the tree, and causing it to become more fruitful. When this object is obtained, if the shoots crowd the branches, half of such shoots must be cut away at one time, and in a year or two afterwards, the remaining half.

In cutting down those shoots, prune them to the lowest bud, if near their origin, otherwise to about half an inch, in order to have new spurs produced from them.

If a Pear tree be in a weakly condition, the branches must be trained in a more elevated direction where it can be done. (*See the Chapter on sickly fruit trees.*)

Thinning the fruit will frequently be required, not only to cause that remaining to be improved, but also to promote the future vigour and fertility of the tree. The proper time for performing this, is as soon as the Pears begin to flesh. The quantity to be left upon a healthy tree, may be two fruit to every spur, and in some cases three.

Pears must be always gathered by the hand, and not be allowed to drop. Summer and autumn pears, must be gathered a few days before they would become dead ripe, as the flavour is then a great deal richer. The proper time at which they must be gathered, may be known by the change in their colour, or by pulling a fruit and opening it, and examining whether the seeds be hard and of a brown or black colour according to the sort of Pear; or by some few fruit naturally dropping off the tree.

Summer Pears should be eat soon after they are gathered, for in a week or fortnight afterwards many of the kinds begin to decay at the core.

Winter Pears may be allowed to hang upon the trees as long as they possibly can be permitted, so that they escape frost which would destroy their flavour.

For other directions in gathering and preserving Pears, (see Orchard.)

Remedies for the diseases and insects which attack Pear trees, may be found in the Chapter on each. The caterpillar usually attacks them at the time of blooming, or very soon afterwards; immediate recourse must be had to destroy them, otherwise considerable damage will be sustained. *(See Chapter on Insects.)*

CHAPTER XXII.

On the Plum Tree trained against a wall, or as an Espalier.

THERE are many kinds of Plums which merit a situation against a wall, indeed some will scarcely be productive without such aid, and of those kinds which bear equally well as standards, or wall trees, the fruit is of a considerably richer flavour and much finer when trained, than when cultivated as standards. In the choice of a tree, and the method of pruning previous to planting, also in the planting, *(See the necessary information given in the respective Chapters upon each.)*

The Plum tree prospers best in a good strong loamy soil, for in light loam or sandy soil, the fruit does not attain to so large a size, or so good a flavour, nor does the fruit set so freely upon the trees. Plums will do against any aspect, but it is the best method to plant early blooming kinds against south or west; the other sorts may be planted upon any aspect, thus by having the same kinds against different aspects, some will ripen earlier than others according to their situation, and a longer continuance of fruit will be obtained.

The distance at which the trees are to be set apart, is for a wall twelve feet high, twenty feet; and a greater or less distance in proportion to the height of the wall. The tree must be mulched and watered every year agreeably to instructions given in the respective Chapters.

The horizontal mode of training is of all others far the best for Plum trees.

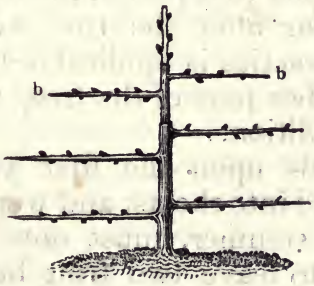
As in treating upon the Apple and Pear, I commenced the date of each year from the first winter pruning of the tree, I shall pursue the same method in the treatment upon the Plum, and shall lay down directions for such a length of time after planting, as I consider necessary fully to convey an accurate description of the mode to be practised.

First Year.—Winter Pruning.—The tree must be headed down at spring. If it be a strong one cut it down to seven buds, but if a weakly one to three buds. When the shoots have pushed about two or three inches long, the uppermost shoot must be trained straight up the wall, and of the other shoots the two uppermost and the two lowest must be trained, two on each side of the main stem, and the remaining two must be rubbed off. As the shoots advance, let them be carefully nailed to the wall. When the upright shoot has pushed about eighteen inches in length, let the top be pinched off so as to leave it about thirteen inches. This

pinching back the shoot ought not to be done later than the end of June or beginning of July. From the upper part of the shoot thus shortened, three or four lateral ones will generally push during the present summer, three of them must be kept, the uppermost to be trained straight up the wall, and one on each side. The branches must be trained at twelve inches apart, for if nearer than this, under my mode of treating the Plum, a proper sufficiency of sun and air would not be admitted to the spurs, &c.

Second Year.—Winter Pruning.— The tree will now be as represented at *Fig.* 1. the upright shoot (or main stem) will require to be shortened down to thirteen inches from the two uppermost branches, b, b, *Fig.* 1. which were produced after the upright shoot was stopped at midsummer*. All the side branches must remain at their entire length, as *Fig.* 1.

Fig. 1.



* The plan laid down for pruning the upright shoot at winter, and stopping it in summer, must be pursued until the tree arrives at its proper height.

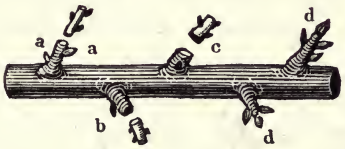
Summer Pruning.—The buds upon that part of each branch which was produced last year, will during this summer be formed either into fruitful ones, as *Fig.* 2. a, or push into shoots, as c. If shoots, they will require to be cut down to two inches in length when they have attained a little woodness, which will generally be the case when they have pushed ten inches in length. If after being pruned down as directed, they should push again several inches long, the cutting of them back to two inches may be repeated, and this as frequently as required. The shortening of such shoots will generally cause them to form a fruitful bud or more near to their origin, as *Fig.* 2.

Third Year.——*Winter Pruning.*—At this period a tree that has been properly managed in every respect as directed, will generally be supplied with a few fruitful buds. My future observations will treat on those spurs which are upon that part of the branch made the first year after the tree was planted. The same practice is applicable to all spurs upon any other part of the tree, at a similar age and condition.

Those buds upon the first year's wood which pushed into shoots, and were shortened during last summer, must now be pruned down so as to leave two fruit buds, as *Fig.* 2. a, a. If there be not a growing bud situated near to the bottom, there is always

an eye or embryo of a future bud, and in that case the shoot must be cut off just above it, as at c. All the natural fruit buds, as *Fig.* 2. d, d, will be productive the ensuing summer.

Fig. 2.

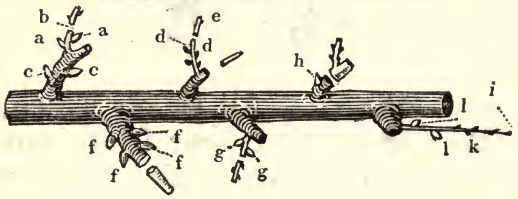


Summer Pruning.—All shoots which push upon those spurs that bear fruit, must be shortened down to three or four eyes, which will generally be to leave them about one inch and a half long; they must be thus cut down, when they have pushed about eight inches. If they require shortening again, it must be done as before. It will frequently happen that there will not be any shoots produced upon some of those spurs which are productive, but fruitful buds will be formed instead of them, as *Fig.* 3. f, f. All shoots which are produced in future upon any part of the tree, may, during the summer be shortened agreeably to instructions given.

Fourth Year.—Winter Pruning.—Upon the shoots which were produced on those spurs, that bore fruit last year, and were shortened once or more as directed, during summer,

there will generally be a fruitful bud or more formed at the lower part of them, as *Fig.* 3. a, a; such fruitful buds must be retained, and the shoot be pruned off at b. In addition to those fruit buds, there will frequently be several more proceeding from the side of the spur, as c, c; all such must be left.

Fig. 3.



If a spur be destitute of fruitful buds at the lower part of a shoot, and instead of having them so situated, should have only one or two at the upper part of a shoot which was shortened last summer, as d, d, the shoot must be cut off just above the uppermost fruitful bud, as e. Those spurs which did not produce any shoots, as *Fig.* 3. f, f, must retain all the fruitful buds there are upon them. It will generally happen that there will now be fruitful buds formed from the embryos to which some of the shoots were cut down at the last winter pruning, as *Fig.* 2. c, they must be left entire. Such of the shoots as were cut down to a growing

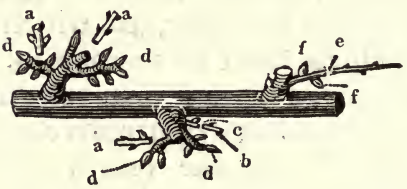
bud last winter pruning, as *Fig.* 2. b, and have now a fruitful bud or more upon them, must be cut off just above such buds, as at *Fig.* 3. g, but if they should still be destitute of a fruitful bud each, let them be cut down to the lowest bud or embryo there may be upon them, as h. If a shoot proceeds the following summer from each one thus cut down, it must not be shortened to one inch and a half as directed for all others, but at the time when the other shoots are pruned, which will be about the end of June or early in July, it must be nailed to the wall in an horizontal direction as i, and an inch or two only cut off the end, as at k. The nailing of the shoot in this manner will cause it to produce a fruitful bud or two near to its origin, as l, l. This practice may be successfully adopted with all shoots it is desired to render fructiferous in any part of the tree, particularly with those which through a vigorous habit produce two or three shoots from the side of a spur, in which case one or two of them must be trained in, and the others cut clean away. In selecting those to be trained in, always preserve such as are situated nearest to the origin of the spur that produces them. It will sometimes happen that through weakness or an unfavourable aspect, the tree will push a great number of shoots and produce very little fruit, in the former case the wood is small

and when upon any spur there is more than one shoot, they must be all rubbed off when about an inch in length, with the exception of one that is best situated; and if there should be a fruit upon the spur leave a shoot above it; but in the latter case of an unfavourable aspect, the tree must be removed in order to effect the desired end. *(See Chapter on the removal of large trees.)*

Summer Pruning.—This must be performed according to the instructions already given.

Fifth Year.——Winter Pruning.—All the spurs upon the first year's wood will now be well supplied with fruitful buds. In that case all shoots that pushed and were shortened last summer must be cut clean away, as *Fig.* 4. a, a, except a shoot should arise from near the bottom of the spur, as b, when such a one should be left and pruned down to a fruitful or growing bud, as c.

Fig. 4.



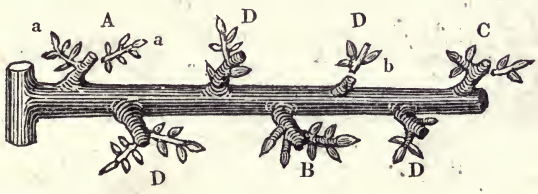
Those shoots that were nailed in during last summer in order to cause them to produce fruitful buds, as *Fig.* 3. i, will now generally be furnished with one or more, as

Fig. 3. l, l, and *Fig.* 4. f, f; the shoot must then be cut back to *Fig.* 4. e. If a shoot should still be destitute of fruitful buds, let it remain its entire length another year, and then at the next winter pruning afterwards be cut back to the first fruitful bud nearest to the branch which it proceeds from. All the fruitful buds, as D, D, D, D, must remain upon every spur.

Summer Pruning.—This must be performed according to the instructions before given.

Sixth Year.—All the spurs upon the first year's wood must now be cut down so as only to leave such a quantity of fruitful buds, as represented by *Fig.* 5. spur A, a, a. Such clusters of blooming buds upon so short a

Fig. 5.

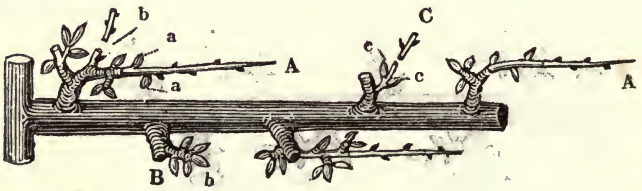


stem I term lateral spurs. After they are thus pruned, let the first spur nearest to the origin of the branch, as spur A, if it be well situated, so that it can be brought to the wall without much force being used, (otherwise the nearest spur that is properly situated) be nailed close to the wall, and at twelve

inches farther on the branch, and on the opposite side of it, let another be nailed in as B. If that part of the branch made the first year after planting of the tree, should extend twelve inches farther still, another shoot must be nailed in at that distance from the second, but on the same side of the branch as the first, as C. This practice of nailing in spurs, must be pursued in every other part of the tree when they are at a similar age and condition.

Summer Pruning.—Upon the spurs nailed in last winter pruning, *Fig.* 5. A, B, C, there will be a shoot produced from each this summer; such shoots must be trained in betwixt

Fig. 6.



the branches, at the distance of four inches from the branch from which they proceed. If more than one shoot pushes from a spur thus trained in, all above that number must be shortened at the end of June, or early in July, to about an inch and a half, and this must be repeated, if required, as directed for

the summer pruning of similar shoots. Also all shoots which are produced upon those spurs which were cut down, but were not nailed to the wall, must be shortened as directed for the general summer pruning.

Seventh Year.——Winter Pruning.——The shoots which proceeded from those spurs cut down last winter pruning, and which were trained in betwixt the branches, as *Fig.* 6. A, must remain their entire length. They will now be furnished with a few fruitful buds near their origin, as a, a*. The spurs which did not require training in, as *Fig.* 5, D, D, must have all fruitful buds retained, and the shoots which were produced and shortened last summer, must now be cut entirely out, or be cut partially down, agreeably to the previous directions.

Summer Pruning.—During this summer, either fruitful buds or shoots will be produced upon those which were trained in last year; the shoots will require to be cut down once or more, to an inch and a half in length, in order to cause them to form a fruitful bud or two.

Eighth Year.—Winter Pruning.—The spurs upon those shoots trained in from the first year's wood, must retain all the natural fruit buds there are upon them; if there be a suf-

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* If more than one shoot was produced, (as described in last summer pruning) cut them down to the lowest bud, as *Fig.* 6. b, A.

ficiency without reserving any of those situated at the bottom of a shoot shortened during last summer, let such be cut clean out; this must be attended to upon all the spurs which are produced on those shoots trained in, when at a similar age, the only exception is as described on treating of the fifth year. I shall only describe in every year's treatment of those spurs upon the shoots trained in, that which is to be practised upon those which are produced on that part of the shoot which pushes the first year, the other spurs upon them must have the same treatment when at a similar age and condition. When the shoots trained in, as *Fig.* 7. A, B, have extended so far as to interfere with the next shoots trained in on the same side of the branch, they must be cut off close to them, at which length they must afterwards be kept, as at c. Those spurs on that part of the main branch which did not require to be trained in, as *Fig.* 5. D, D, must have every other of the spurs cut down to two fruit buds, and the remainder to three fruit buds each.

Summer Pruning.—This must be attended to in every respect as before directed.

Ninth Year.—Winter Pruning.—Those spurs upon the shoots trained in, must retain all their natural fruit buds: all shoots which are upon them and were shortened during summer, must be cut clean away, providing there be four natural fruit buds upon each spur;

but if not, cut each shoot off to the lowest bud upon it. Those spurs upon the main branch, as *Fig.* 5. D, D, which were last year cut down to two fruit buds, must now be cut down to the lowest bud there is upon them, providing that such bud is not more than one inch from the origin of each spur, otherwise the spur must be cut down to an embryo, as *Fig.* 5. D, b. The remaining half of spurs which were last year cut down to three lateral spurs, as spur A, *Fig.* 5. a, a, must retain all the fruit buds there are upon them; and any shoots that may have pushed last summer, and were shortened, must be pruned down to one bud, or be cut entirely away, according to previous instructions.

Summer Pruning.—If shoots are produced from the spurs cut down, let them be shortened back to three buds, as frequently as required.

Tenth Year.—Winter Pruning.—The spurs upon the shoots trained in, as *Fig.* 5. A, B, must be pruned so as to leave four fruit buds upon each spur; and the shoots which pushed from those spurs on the main branch, as *Fig.* 5. D, D, and that were cut away last winter pruning, and also were shortened during summer, to three buds, will now generally be furnished with one or two fruitful buds, as *Fig.* 6. C, c. If the buds be plump and well matured, leave both, otherwise only one. It will frequently happen that instead

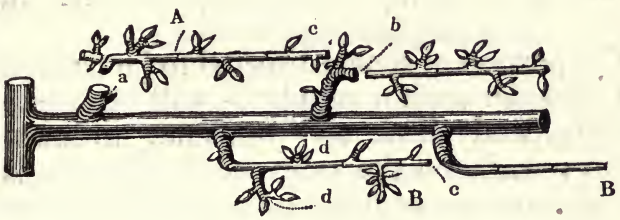
of shoots pushing from the spurs cut down, fruitful spurs will have been produced, as *Fig.* 6. B, b, such must be left entire. Those spurs upon the branch which were not cut down, as the spurs B, C, *Fig.* 5. may now have four fruit buds left upon each spur.

Summer Pruning.—This must be performed as before directed.

Eleventh Year.——*Winter Pruning.*—Every other of those shoots trained in from that part of the branch made the first year, must now be pruned back to the lowest bud or spur there is upon them, as *Fig.* 7. A, b. I adopt this method of pruning back, the shoot trained in, the first time, by cutting to a fruit bud or spur; but when a second renewal is required, I cut the shoot down to an eye or embryo of a bud, as A, a; and at the third, to a bud or spur. This practice must regularly be pursued in future. If it should happen, (but which will rarely be the case) that there is not any appearance of an eye, then cut it back to a bud or spur nearest its origin as before directed. The spurs upon those shoots trained in which are to remain, as *Fig.* 7. B, must have four or five fruit buds each, as d, d, and the next (or twelfth) winter pruning, they must retain the same quantity. When the shoots produced by cutting back those, as a, b, *Fig.* 7. have come to a bearing condition the following winter pruning, the remaining shoots trained in, as B, B, must

also be pruned back to the lowest bud or spur, as a, b.

Fig. 7.



The spurs upon the branch, as *Fig.* 5. D, D, which were cut down at the ninth year, must retain all their fruitful buds: and those which were not cut down, but last year had four fruit buds upon each, must now be cut down to two, and at the next winter pruning must be cut down to the lowest bud, or entirely away, as practised upon the others.

This regular system must be pursued with all spurs similarly situated in every other part of the tree, when they are at that age and condition to require it agreeably to the instructions already given. When the shoots and spurs, produced by cutting them down in the manner described, have borne fruit for the length of time they were allowed to do before being cut down the first time, they will then require it again. My reasons for treating the Plum tree in the manner laid down is, that when nothing but spurs

are allowed upon the branches, the trees are not so fruitful, by reason of being too luxuriant. But by allowing shoots to be trained in between the branches as directed, the sap is properly employed in the production of fruit.

The portion of shoots directed to be trained in I consider such a supply as will moderate the sap, and check any tendency to luxuriancy; while on the other hand, the tree is not allowed to support more wood or fruit one season, than its general strength and health will allow, by which caution it is saved from weakness and ultimate unproductiveness. The shoots are also at such a distance that they will not injure one another, but a proper degree of sun and air is admitted to the tree.

By this practice a great many more spurs are supported than if main branches were only allowed, and they trained closer together; also the fruit in the latter case would be considerably smaller, than when produced upon such young shoots as it is my practice to encourage and retain in the tree. When a tree has filled up its allotted space, the branches may occasionally be shortened back to a spur or shoot; this may be repeated as frequent as necessary, taking care not to shorten it more than one foot at a time. It will however at length be required to obtain an entire new head, which may be effected

by cutting each branch out to a shoot near its origin, or by wholly heading down the tree. *(See Chapter upon Apples.)*

On Plums trained as Espaliers.

The planting and mulching of the tree must be performed according to the directions given in their respective places. *(See Index.)* The tree must be headed down at spring, and in order to form the head be treated as wall trees. If the trellis against which the trees are trained is made of upright bars, *(see Chapter on Espaliers,)* the tree must be treated in every respect as wall trees are, only the spurs may be allowed to retain more fruitful buds than wall trees. The reason for such allowance is, that the trees have a much greater circulation of air than those against walls; also the trees being trained more dwarf, will very well admit of it so as not to sustain any injury.

Of forcing Plums.

Where there is the conveniency of houses for forcing fruit trees, Plums may successfully be forced. If there is not a house expressly devoted for Plums, they may be introduced into any forcing house, by having them

planted in large pots or tubs; which is indeed preferable to having them in the border of a house constructed on purpose. The planting of the trees must be performed in autumn agreeably to the instructions given in the Chapter on planting and pruning, previous to planting, &c. When the trees are to be planted in pots or tubs, the soil must be a strong loam with a little mixture of well rotted cow dung. After the tree is planted, let the pot be plunged up to the rim in a border or elsewhere. The tree must be headed down at spring to six buds, and the shoots which push must be allowed to grow at full length during the first season. The second spring, the pots wherein the trees are planted, must be taken up out of the place where they were plunged; and if any roots have extended themselves into the earth through the hole at the bottom of the pot, let such be dressed clean off. This dressing away the roots that have pushed through the hole at the bottom of the pot, must be attended to in every future year, when required. When the tree is come to a bearing condition, it will then generally require to be shifted into a pot or tub two sizes larger than that in which it was previously. After this removal, the tree will by judicious management bear fruit for ten or twelve years before it will require to be potted again. At the second winter pruning, all the shoots

must be shortened to about two-thirds of their length, and in every future year until the tree comes to a bearing condition, this method of pruning back the shoots at winter pruning must be attended to. But when the tree has become productive, all shoots but the leading ones must be shortened both in summer and winter pruning, as directed for wall trees. The leading shoots must be allowed to grow at full length during summer, and at winter pruning be left about one-third of their length. Always retain all short lateral fruit spurs.

In introducing the tree into the forcing house, it should not be brought suddenly into a high temperature, but as gradually as circumstances will admit. If the tree be placed upon a warm flue, it must always be set in a saucer wherein a little water should generally be kept. Let the tree be regularly attended to with water, so that the soil never becomes too dry, as that would cause the bloom or fruit to drop off. Let manure water be given to the roots every third time of watering. Attention must be given to sprinkling water over the top of the tree once or twice before the opening of the blossom, but it must be desisted from as soon as the blossom opens, and be applied again when the fruit is set. *(See Chapter on watering the tops of fruit trees.)*

Plums are also forced in a house designed

for the purpose, as already alluded to. When it is desired to have ripe fruit at any particular time, begin to force the trees about sixteen weeks before. In commencing forcing, let the sashes be placed over the trees a fortnight before fire heat is applied. When fire heat is introduced, let it be so regulated for the first two weeks, as to keep the temperature at 40 degrees Fahrenheit, and then raise it to 50 degrees until the bloom expands. When the fruit is set, let the heat be increased to 60 degrees. After it is stoned, raise it to 65 degrees, at which it may afterwards be kept.

It will be necessary to admit all the air that can possibly be given in mild weather.

The trees will require watering at the tops once or twice before the bloom opens; but no water from the time the bloom begins to expand, until after the fruit is set; instead of which, let dews be raised in the house by pouring water upon the heated flues. After the fruit is set, water the trees over the tops every other day at least; early in the season it is best to water in the morning, but later, in the evening. Desist from watering over the tops when the fruit approaches maturity, and if the season then be mild, let the sashes be entirely removed, by which a full admission of sun is afforded to the fruit, which will be much improved in flavour. The watering of the border must be regularly

performed, if the border is not in a very moist state when the forcing commences, give it a watering of manure water, but no more until after the fruit is stoned, unless the border happens to be very dry. After the fruit is stoned, water once a week with manure water, until the fruit approaches maturity. *(See the Chapter on watering the roots of fruit trees.)*

CHAPTER XXIII.

On the treatment of the Cherry tree trained against a wall, also of forcing it.

THE Cherry thrives best in a good rich strong loam, upon a dry bottom, *(See Chapter on the formation of fruit tree borders.)* The May Duke requires a richer soil than any of the other kinds.

The tree must be a maiden plant, and be treated in pruning the roots, planting the tree, also in mulching and watering it, agreeably to the instructions given in each separate Chapter. The distance at which the trees must be set apart is, for May Dukes twenty feet, but any of the other kinds twenty-four feet.

All kinds of Cherries do best when trained horizontally, but as some sorts require a different mode of treatment from that which suits others, I shall commence with the May Duke, dating each years instructions from the winter pruning.

First Year.——Winter Pruning.—Let the tree be headed down at spring to seven buds.

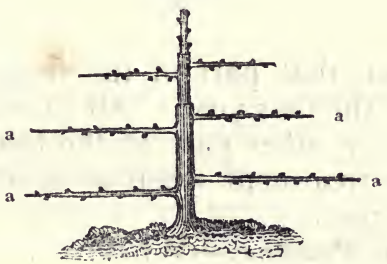
Summer Pruning.—When the buds push, let the uppermost be trained straight up the wall, and of the remaining six shoots, two

must be trained in on each side, and the others be rubbed off. As the side shoots advance, let them be regularly secured to the wall, but never shortened until they have extended to the length it is desired to have the branches. When the upright shoot, or lead, has advanced to sixteen or eighteen inches in length, let the top be pinched off, so as to leave it only twelve inches long. Of the shoots which push after the lead being stopped, the uppermost must be trained straight up the wall, and the next two, one on each side; all others must be rubbed off.

Second Year.—Winter Pruning.—The upright shoot must now be cut down to twelve inches from where it was stopped last summer. The practice laid down of stopping the leading shoot in summer, also in pruning it in winter, must be pursued until the tree reaches its destined height. The tree will now be in the condition described by *Fig.* 1.

Summer Pruning.—If any shoots push from

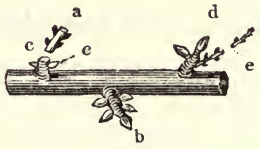
Fig. 1.



the branches, a, a, a, a, *Fig.* 1. during this summer, they must be allowed to grow until the lower part has attained a woody state; they must then be cut down so as to leave four eyes; this may be repeated, if required. It will frequently happen, that instead of shoots pushing, as *Fig.* 2. a, some natural fruit buds will be formed, as b.

Third Year.—Winter Pruning.—Whatever shoots were produced last year from that part of the branch made first year after planting, as represented by a, *Fig.* 2. must now be cut down to two buds, c, c. It will generally be the case, that one or both of those left will be fruitful, and productive next summer. All the natural fruit buds must be left entire, as b, *Fig.* 2. I shall only treat upon those spurs and shoots which are pro-

Fig. 2.



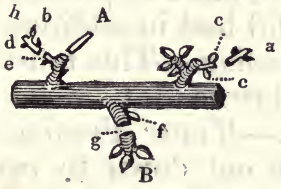
duced upon that part of the branch which was made the first year. All the shoots and spurs in any other part of the tree, require the same treatment when at a similar age and condition.

Summer Pruning.—Whatever shoots are

produced upon those spurs which are now productive, as *Fig.* 2. d, they must be cut down to four eyes, as e. This practice of summer pruning must be attended to in future, to all similar shoots produced in any part of the tree.

Fourth Year.—Winter Pruning.—All shoots that were produced last summer and cut down to four eyes, must now be pruned down to two buds, *Fig.* 3. c, c. It will sometimes happen that a shoot will have pushed from a spur that bore fruit last summer, as h, A, and that only one fruitful bud is formed upon that part of the shoot which was left, as b, the other buds being growing ones, as d. In that case cut the spur down to e; this will generally cause a shooto t push, or a fruitful bud to be formed from an embryo

Fig. 3.



or bud. This attention to procure and retain a shoot or fruitful bud near to the origin of a spur, is particularly required in the May Duke Cherry, as the embryos of buds are not so rank, neither so certain to be produced,

as in the Apple, Pear, Plum, &c. Therefore whenever a bud or shoot is produced near to the origin of the spur, as B, f, let such be encouraged by cutting away a part of the spur to g. And if the general instructions laid down each year for the treatment of spurs, should not direct such a one to be cut down at that year, the regular plan must in that case be deviated from, and such bud or shoot be encouraged as much as possible in the manner described.

Summer Pruning.—This must be performed according to the foregoing instructions.

Fifth Year.—Winter Pruning.—The spurs must now be allowed to retain all the fruitful buds there are upon them. If there should be a sufficiency of natural fruit buds, let the shoots which were shortened last summer be cut entirely out, unless one has been produced near to the origin of the spur, as in *Fig.* 3. B, f, when such must be pruned so as to leave another fruitful bud in addition to that.

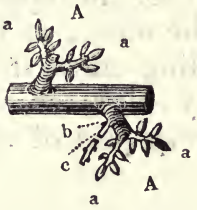
Summer Pruning.—This must be attended to as before directed.

Sixth Year.—Winter Pruning.—The spurs must now be cut down to two clusters of fruitful buds, as *Fig.* 4. A, a, a. I shall in future designate such clusters by the term lateral spurs, and the spurs upon which such are situated, as A, A, branch spurs.

If there be two good lateral spurs well situated upon each branch spur which is to be

cut down as directed, let all shoots that were made last year, be cut entirely away, unless a shoot should proceed from near the origin of the branch spur, as b, when it must be pruned to one bud, as c.

Fig. 4.



Summer Pruning.—This must be performed as before directed.

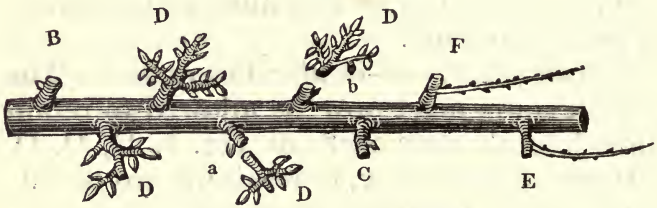
Seventh Year.——*Winter Pruning.*——The branch spurs must now be allowed to retain three lateral spurs each, as *Fig.* 5. D, D, D, cutting entirely away, or retaining any shoots which were produced and were shortened last summer, as may be required.

Summer Pruning.—This must be attended to as before directed.

Eighth Year.—*Winter Pruning.*—The first spur nearest to the bole of the tree must now be cut down to the lowest bud upon it. This is done in order to cause a shoot to push from the part that is left, which must be trained in horizontally between the branches, and at four inches distance from the branch from

which it proceeds, as *Fig.* 5. F. If that part of the branch produced the first year after the planting of the tree, extends eighteen inches farther than the first spur which was cut down, as B, let another spur be cut down at that distance from the first, as C, and another shoot be trained in between the branches, but it must be at the opposite side of the branch from the other, as E. This regular system of nailing in a shoot between the branches every eighteen inches, must be practised in every part of the tree when the

Fig. 5.



spurs are at the same age. Thus some spurs must be cut down, in order to produce a shoot, at the next winter pruning, upon that part of the branch which was produced the second year after the planting of the tree, &c.

Those spurs that did not require to be cut down in order to produce shoots, as E, F, must each retain three lateral fruit spurs, as D. If such spurs D, D, are situated

rank upon the branches, two or three of them may be cut down to the lowest bud upon them, as D, a; but if there be a good embryo, cut down to that, as b. This method of cutting in such spurs to two or three lateral ones, in order to bring them to as close contact with the wall as possible; also to cut two or three entirely away to one bud, or to a good embryo when a spur is supplied with them near to its origin, as D, a, b, must always be attended to: but never cut a spur entirely down except it be a very young one, unless there be a bud or plump embryo to prune to, for shoots are not so readily and abundantly obtained from the May Duke Cherry, as from the Apple, Pear, and Plum. After a new spur obtained by cutting down as directed to a bud or embryo, has borne fruit five years, it may then be cut down again.

Summer Pruning.—Those shoots that push from the spurs cut down, as B, C, must be regularly trained in, and all other shoots be attended to as already directed.

Ninth Year.—The shoots that were trained in last summer, must remain their entire length until they have extended three feet, when they must be stopped, as they will then have reached up to the next shoot nailed in at the same side of the branch. They must afterwards be reserved until the spurs upon that part of the shoot produced the

first year after being trained in, have borne fruit four or five years, at which period they must be cut entirely back to the first bud or spur nearest to their origin; and the new shoot which afterwards pushes must be trained in and pruned as the first shoot and its spurs. The branch spurs which are upon the shoots thus trained in, must be allowed to retain all the lateral spurs there are produced upon them, and cut entirely away all shoots that are produced on the spurs when there is a sufficiency of fruit buds without them. The summer pruning of all shoots produced upon any part of those trained in, as B, must be performed as directed before. When shoots, as B, E, have been renewed twice or three times, by cutting back to a bud or spur as before directed, each must at the next required renewal be cut entirely down to an embryo. A year or two previous to cutting away such a shoot, let another spur situated upon the main branch, be cut down, and a shoot be trained in so as to supply the place of that one cut entirely away. After there has been a renewal of spurs and lateral shoots trained in for such a length of time, that it is found expedient to have a fresh supply of main branches, this may be procured pursuant to the directions given for that object in the treatment of the Apple.

MORELLA CHERRY.—The best methods of training the Morella Cherry tree, is the ho-

rizontal, or half fan method. *(See Chapter on training of fruit trees.)* Train in the horizontal method when the tree grows very vigorous, and the half fan method when weaker. The fruit is considerably improved in flavour by the tree being planted against a south or west aspect, upon which it is advisable to have some planted, as well as upon other aspects.

First Year.—Winter Pruning.—At spring let the tree be headed down to three or seven buds according to its strength.

Summer Pruning.—When the shoots push, let them be regulated as done to the May Duke Cherry, taking care that the branches are not nearer together than twelve inches.

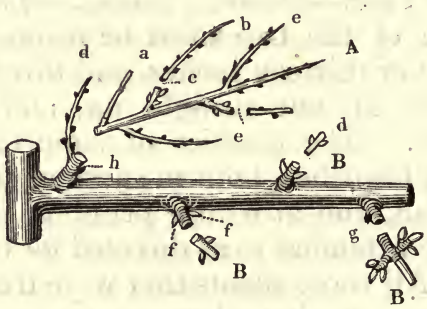
Second Year.—Winter Pruning.—The leading stem of the tree must be pruned down to twelve or thirteen inches, and three shoots be trained in, one straight up, and one on each side. The practice of supplying the tree with branches, both in summer stopping of the lead, and at winter pruning, must be regularly attended to as directed for the May Duke. All those shoots that were trained in last summer, for branches, must remain their entire length.

Summer Pruning.—Whatever lateral shoots are produced upon the branches, they must be trained in betwixt them, taking care that all such shoots are not trained nigher than three inches from each other.

Third Year.—Winter Pruning.—The lateral shoots which were trained in between the branches last summer, must now be pruned back, so far as to leave them about one-third of their length. The lead of every branch must be allowed to grow without being stopped, until the tree has filled its allotted space.

Summer Pruning.——During this summer fruit will generally be produced on the shoots which are trained in betwixt the branches, as *Fig.* 6. a; but it will sometimes happen that a shoot or more will push instead of fruit being produced, as b, b. If there be a

Fig. 6.



sufficient space between the branches so as to have the shoots three inches apart, as many as will supply it, may be retained, and nailed in, all others must be cut down to four buds when the shoots have attained a little hardness, which will generally be the

case when they are ten inches long, as e; this cutting in of the shoots must be repeated if found necessary. In making choice of shoots to be trained in, first select the lowest one, as d, and then others best situated and matured.

Fourth Year.—Winter Pruning.—All shoots that were trained in between the branches must now be shortened, those that are strong must be left two-thirds of their length, and those that are weakly one half. If any shoots pushed and were shortened as directed during the summer, they will now generally be furnished with fruitful buds, and must be pruned down so as to leave two or three upon each, as e, c, and at the next winter pruning cut them entirely away.

If more lateral shoots push from the main branches than are required for training in as A, let such be cut down in summer to four buds, and at the following winter pruning to two, as B, f, f. Such shoots will afterwards make productive spurs, one every five inches may be retained, as B, B, and all others be cut entirely away after having borne fruit one season. Those that are retained and to be treated as spurs, as B, B, must always be kept as close to the main branch as possible. This may easily be effected, for they readily push out new shoots near the origin of each spur. Whenever any of the spurs extend more than three inches from the branch

which produces them, let them then be cut down to the lowest bud or embryo upon them, as B, g.

The system laid down for pruning all shoots both in winter and summer, also for pruning in, or entirely out, all spurs, must be practised in every part of the tree.

As the fruit is principally produced from the shoots made last year, a regular and suitable supply must be retained in every part, and particular attention must be paid to preserve and encourage those shoots that are situated near to the origin of that which each proceeds from. When any of the lateral branches trained in, have extended as far as they can be allowed without crowding others, let such be cut back to a shoot near their origin, for a supply, as *Fig.* 6. A, h. And when such a renewal has been obtained in this manner for three or four times, if a bare part of the branch is caused by it, let it be cut close up to its origin, and if a shoot should not afterwards push from the side of where it was cut down, (but this will rarely be the case) let one of the spurs situated upon the main branch be nailed in, and a shoot be trained in for a supply. When a main branch is required to be cut in, it may safely be done, by cutting to a lateral branch as far back as necessary.

When a tree is very vigorous, let a little more young wood be trained in than is di-

rected for a regular bearing tree. This additional quantity of shoots must not be trained in any longer than is required to moderate the vigour of the tree.

Harrison's Heart Cherry tree, may be treated in every respect as the May Duke, only train in double the quantity of young wood between the branches, and after a shoot has borne fruit, two or three years at most, cut it back to the lowest spur or bud upon it, and a shoot which pushes from the part so left must be trained in as before. A spur may be very safely cut down in order to obtain a new one, as the embryo at the base of such a spur is certain to push. In regulating the spurs situated upon the main branches of the tree, let one half of those that have borne fruit three years be pruned so as only to leave one lateral spur upon each, and two years afterwards let such be cut down to the lowest bud or embryo upon them; and at the same time that those are cut entirely down, let the remaining half be cut to two lateral spurs each, and then two years afterwards be cut down to the lowest bud or embryo as done to the others. All new shoots which push from those spurs cut down, must be shortened once or more in summer to four buds, and at winter pruning to two buds each; those will form the new fruitful spurs, and must be

treated in every respect as directed for those that were taken away.

All other kinds of Cherries may be treated as described for the May Duke.

On forcing the Cherry.

Cherries may be successfully forced when planted in pots or tubs, also as trained trees in a house designed for that purpose. The May Duke is far the best for forcing. The soil and formation of a border for a Cherry house, may be the same in every respect as directed for a border in the open air. The front wall ought always to be built upon piers, so that the roots of the trees can extend themselves beyond it.

First of those trained in a house constructed for the purpose. The pruning and training of the trees must be performed agreeably to the instructions given for trees trained in the open air. The period of commencing forcing, must be regulated according to the time it is desired to have the fruit ripe. It will require fourteen weeks to mature them by beginning the first of February; but to begin at the first of January it would require about sixteen weeks. This is not precisely the case at all times, as the general state of the season, by being cold and cloudy or otherwise, will

make it longer or shorter. Never begin forcing before the last week in December, or first in January, and let the sashes be placed over the trees for two or three weeks before firing is commenced. This is always necessary, that the trees be not subjected to too sudden a transition from cold to heat, which would injure the bloom buds. Nature works gradually, and it is the perfection of art to assist, and not to thwart her operations. When fire heat is introduced, let it be so regulated that the thermometer be kept during the night to 40 degrees Fahrenheit, allowing a few degrees more in the day time. This heat must be kept for two or three weeks; it must then be raised to 46 degrees. In a fortnight afterwards the trees will generally be in bloom, when the heat must be kept very regular at 52 degrees. After the fruit is set, let the heat be raised to 55 degrees, and when it is stoned, raise it to 62 degrees, at which it must afterwards be kept; allowing four or five degrees more for sun heat than fire heat. In raising the heat five or six degrees in a fortnight, as directed, always let it be done gradually, by a degree in two or three days; only take care that it reaches to that degree mentioned in the time prescribed. During every stage of forcing the tree, admit plenty of air at every possible opportunity; but when the blossoms are expanded, be careful that a frost air does not

reach them, as the pistillum is very soon damaged thereby. At every other period a large portion of air may be admitted.

The watering of the trees must also be particularly attended to. At the time when the sashes are first placed over the trees, if the border is not very moist, let there be a good portion of manure water poured over the roots; and this may be repeated again as soon as the bloom expands. When it is done the latter time, let the cold chill be taken from the water, by placing it for a little time before a fire in watering pots, or otherwise. This attention must be paid to the water which is applied every succeeding time, else a great deal of the bloom or fruit will drop off. During the time that the fruit is stoning, no water must be applied to the border, providing the soil be in a moist state. After the fruit is stoned and begun to swell, let water be applied as frequent as required, so that the border be kept in a proper moist condition until the fruit is beginning to change its colour for ripening, when it must be desisted from. The tops of the trees must also be sprinkled over with soft water once or twice after the sashes are placed over the trees, and previous to fire heat being commenced. After the firing is introduced, let them be sprinkled over every two or three days, this considerably strengthens the buds and assists them to

break regularly and boldly. All water that is applied after fire heat has been used, must be brought from a stove or elsewhere, and have the cold chill taken off by warming it, if required. The water must also be of a soft nature. This is particularly necessary, otherwise a great portion of the bloom or fruit would fall off; as the season and fruit advances, this caution will be rendered less important. From the period of the blossom expanding to the petals dropping off, no water must be applied over the tops of the trees; but if there be a flue upon which water can be poured, this must be done morning and evening in order to raise a plentiful supply of steam, which will be very beneficial to the bloom. After the fruit is set, the trees may be sprinkled again once every day. Early in the season, let it be done in the morning before the sun acts fully upon the trees: and later, in the evening half an hour before the sun leaves the house; at which time the house ought always to be closed, in order to confine in it a good degree of solar heat. Leave off watering when the fruit approaches maturity. When the blossom is fully expanded, if bees do not come into the house, let the sashes be opened for an hour on a mild sunny day when it is windy, this considerably assists the impregnation of the blossom.

Forcing Cherries in pots or tubs.

The same attention to planting and heading down the tree must be used as is directed to be practised to the Plum. In pruning the tree after it has come to a bearing condition, endeavour to retain as great a portion of lateral spurs upon each main spur as is directed for wall trees; also to cut in such spurs in order to obtain a renewal. And when the tree has extended to such a size as desired, it may be kept at that state by cutting back the lead of a branch to a shoot situated lower down, in order to be furnished with a new one. The tree may be headed down, when required, by cutting down to the lowest bud or shoot there may be upon each branch. The roots of the tree must be well supplied with manure water, pouring it over the soil, and not into a feeder as is frequently done by many persons to the injury of the tree, for retaining stagnant water to the Cherry will cause it to cast its fruit; but by a regular attendance the soil may always be kept in a moist condition*. In introducing the trees into any house for forcing them, let it be done as gradually as possible, by first placing them in the most cool part of the

* Attention must be paid to watering over the tops of the trees agreeably to instructions given for trained trees in the Cherry house.

house, and afterwards removing them so as to suit the trees and other conveniences.

Whatever insects the Cherry tree may be attacked with; *(see remedies in the Chapters upon the different sorts of insects.)*

CHAPTER XXIV.

On the Apricot Tree.

THE Apricot requires a soil rather lighter than the Apple and Pear. *(See the Chapter on the choice of soil and formation of fruit tree borders.)* The tree should be trained so as to let the branches have an elevation to their extremities of twenty degrees; this may be varied according to the luxuriancy or weakness of the tree. *(See Chapter on training of fruit trees.)* The distance at which the trees are to be planted apart must be twenty feet. *(See directions for planting, mulching, &c. in the Chapters on each.)* The tree must be a maiden plant.

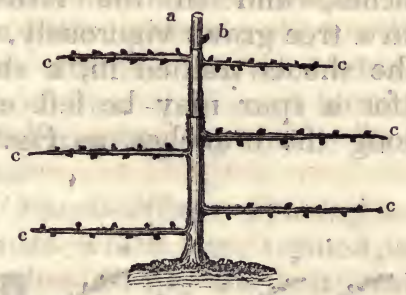
First Year.—Winter Pruning.—Let the tree be headed down at spring to nine buds.

Summer Pruning.——When the buds have pushed and the shoots are about six inches long, let the uppermost be trained straight up the wall for a lead to the tree, and the next two, as well as the two lowest, must be trained two on each side the leading stem, training them at sixteen inches apart; all other shoots must be rubbed clean off. If the leading shoot should have pushed twenty inches long by the middle of June, let the

top be pinched off so as to leave it seventeen inches in length, this will cause a few shoots to push from the upper part of it; three of them must be retained, the uppermost for a lead, and the next two, one on each side. But when the leading shoot has not attained a suitable length at the time described, let it not be stopped at all until the next winter pruning, when it must be pruned down to seventeen inches.

Second Year.—Winter Pruning.——If the leading shoot a, *Fig.* 1. should have pushed seventeen inches or more since it was stopped last summer, let it be kept at that length by

Fig. 1.

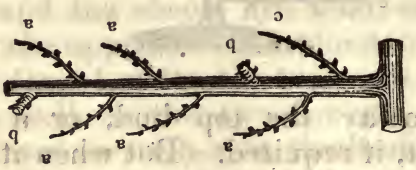


cutting away the top bud, or a part of the shoot, if required. But when it has not pushed to such a length as sixteen or seventeen inches since being stopped last summer, let it then be cut down to the lowest bud nearest the uppermost shoots trained in, as b; the

shoots, as c, c, c, c, c, c, must be kept at their entire length. The method already laid down in order to obtain a proper supply of branches, must be pursued, both as to stopping the lead or otherwise, in summer, also in pruning it back in winter until the tree reaches the desired height.

Summer Pruning.——During this summer lateral shoots will push from those parts of the branches produced last year. A regular distribution of those that are best inclined to the wall, must be trained in betwixt the branches, as *Fig.* 2. a, a. If the tree shoots vigorously, train them at three inches apart; but if weak, at four inches, so that in the first case four shoots may be trained in betwixt the branches, and in the latter three. Also when a tree grows vigorously, in addition to the shoots trained in, a shoot well situated for a spur may be left every six inches along the branches, as *Fig.* 2. b, b,

Fig. 2.



such shoots must be allowed to grow until they are about ten inches long, when they must be cut down to three buds; this will

generally be required about the first week in June. In selecting shoots for this purpose, retain those that grow most from the wall, so that in their subsequent growth they may not smother, or otherwise injure those shoots that are trained in between the branches, as a, a, a, a, a, c. In retaining shoots to be trained in, always preserve for one that which is nearest the origin of the branch which it proceeds from, as c. After that a proper choice of shoots has been made for training in, also for forming spurs, let all others be cut clean away. This regulation of the young wood must take place when it has pushed about four inches long. Those shoots that are retained must be allowed to grow in their natural direction, until the wood has got a little hardness, which will be when they have attained ten or twelve inches in length, and then they must be trained in or be cut down according to the foregoing instructions.

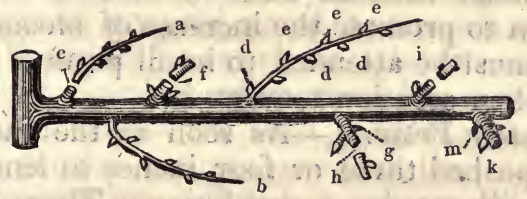
Third Year.—Winter Pruning.—Many of those shoots which were trained in between the branches during the last summer, will generally now be furnished with blossom buds, such buds are very distinguishable from the growing buds, being plump and round, also of a lighter colour, whilst the growing ones are small, narrow, and quite pointed, as well as of a darker colour. All shoots that are thus supplied with bloom

buds will require pruning, unless a shoot should have nothing but bloom buds and the growing one at the end, as *Fig.* 3. a, in which case the shoot must be left its entire length, as b, except that shoot which is situated nearest to the origin of the branch which it proceeds from, as a, when such a one must be cut down so as to leave it about three quarters of an inch in length, as c. This will cause it to push a shoot from the part that is left, without which caution there would not have been one produced in so desirable a situation, for it must always be cautiously endeavoured to obtain and preserve a shoot as near to the origin of the branch which it proceeds from as possibly can be done, both in the summer and winter pruning. Although some shoots may be so furnished with bloom buds, and only a growing one at the extremity of each, yet it will very generally be found to be the case, that a shoot will be supplied with a growing bud or two near its origin, and also several more in various parts of the shoot as growing buds e, e, e, bloom buds d, d, d.

The shortening of those shoots must be proportioned to their strength. If they be vigorous take away one quarter of their length, but if weakly, one-third, and in some cases one-half. Always take care to prune to a growing bud, and about a quarter of an inch above the bud, also to let the cut be

made to slope in the same direction as that in which the bud grows. Those shoots which were shortened during the last summer to three buds as directed in order to form them into spurs, will now very probably be furnished with one, two, or three fruitful buds each. If there be three, prune the shoot back to two, as f. If there be two and the lowest be a growing bud, as g, prune it to one fruitful bud, as h. If there be only one, and it be lowest, as i, cut it down to that; but if it be the uppermost, as k, let the shoot remain its entire length, and the second bud, l, will push a shoot next year, whilst the lowest, m, will form a fruitful bud; and at the following winter pruning it must be cut off just above the bud m. The regulating of these spurs

Fig. 3.



in future, must be directed to obtain and keep them well furnished with fruitful buds. Such buds will be produced at the lower part of those shoots that afterwards push and are shortened to three or four buds in

summer pruning, and to two in winter pruning, also upon short lateral spurs, as *Fig.* 4. d, d. When there is a sufficient supply of such lateral spurs, all the shoots which have been produced and shortened as before described, may be cut clean away at winter pruning, with the exception of a leading one, as *Fig.* 4. e, and one that may proceed from very near the origin of the spur, when in those cases they must be pruned as directed before. After those spurs have borne fruit three years, let each be cut down to the lowest bud or to an embryo, for a new succession. If at any time there be a want of blooming buds, and the shoots which are shortened do not form any near to their origin, a sufficiency of such shoots must be nailed to the wall, and be trained in horizontally or pendulous, which will cause them to produce blossom buds as desired. This caution to promote the increase of blooming buds must be attended to in all parts of the tree when occasion requires it.

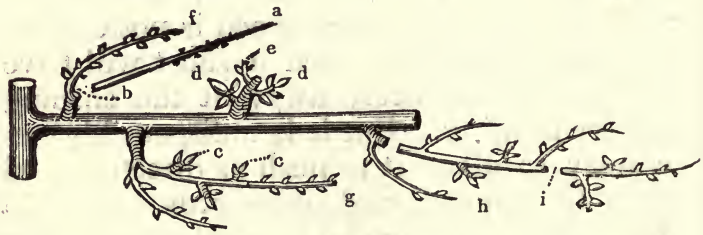
Summer Pruning.—As soon as the shoots have pushed three or four inches in length, they will require a regulation. There will generally be two, three, or more shoots produced on the last year's wood which was trained in between the branches, as *Fig.* 3. a, b. The uppermost and lowest shoots must always be retained, but all others be rubbed off, or pruned clean away. When those that

are reserved have attained about nine inches in length, they must be nailed to the wall at three inches apart. But when there is not a sufficient space between the main branches to admit of two shoots being trained in from every shoot of the last year's wood, so that the new shoots be at the distance from each other as stated; let the uppermost shoot be pruned back to four inches in length, and when it pushes again a few inches, let the top be pinched off so as to leave about an inch of that part which pushed the last. The lowest shoot must be nailed in at full length. If a tree be very vigorous, both shoots must be left if possible, so that they do not crowd and smother each other, which would encourage instead of prevent luxuriancy. The necessity of training in for a while, and afterwards shortening the uppermost shoot as here directed is, that if it was allowed to grow all the season, it would crowd the tree too much, also it would be exhausting the strength of the tree; because when wood is not desired as before alluded to, such a shoot will have to be pruned entirely away at the ensuing winter pruning. But it is indispensibly necessary to allow it to push as directed, and then be stopped, and afterwards to push a few inches and then be stopped again. Because without a leading shoot the fruit would not ripen, but by treating it in the manner described, the fruit will derive every required

assistance from it, and the strength of the tree is thereby prevented from being uselessly employed, which would be the case if the shoot was allowed to proceed undisturbed.

Fourth Year.—Winter Pruning.—The shortening of all fruitful shoots must be performed agreeably to the instructions given last year; also as many must be retained as will furnish the tree at three inches apart. The shoots, as *Fig.* 4. a, which were last summer stopped at four or five inches in length, must now be pruned away, and all that part of the two year's old wood with it as far as to the shoot which is retained, as b. But if there be a want of wood in any part, such a shoot as a, must be kept, as g. All the natural fruit spurs upon the two or three year old wood of those lateral branches trained in, must be preserved, as c, c.

Fig. 4.



Summer Pruning.—This must be attended to by hand dressing and nailing in, or shortening any shoots as before directed.

The instructions given for hand dressing, &c. in summer, also for shortening the bearing shoots, and cutting others entirely away at winter pruning, must be strictly attended to in every future period, and stage of the tree. Always encourage and retain those fruitful shoots that are nearest to the origin of the lateral shoot which proceeds from the main branch, as h. And when the lead of a lateral shoot has extended twenty inches or two feet at most, from the main branch, let all that part of such lateral shoot above the lowest one upon it, as h, be cut entirely away. But if there be a want of fruitful wood, a less portion of such lateral shoots must be pruned away, so as to leave two or three shoots remaining, as at i.

When it is required to prune away a part of a main branch, it must be performed very cautiously, by not cutting farther back from the end than three feet, and also by pruning close to a shoot for a succeeding lead.

Apricots are very susceptible of injury from pruning away any strong branches. It is therefore advisable always to prune back any desired part when the wood is not more than four years old. A little foresight into what would be required to be performed in a few years, will point out the time when to prune back a part of a branch. Thinning the fruit, or thinning the leaves away at autumn when required, must be attended to

according to the instructions laid down in the Chapter upon each.

Apricots trained as espaliers must have the same attention as is directed for wall trees.

CHAPTER XXV.

On the Peach and Nectarine trained against a wall, also in forcing them.

PEACHES and Nectarines require to have a south aspect, and in cold exposed situations must also have the assistance of flued walls. A suitable soil for the trees is a rich loam, not so strong as for Apples and Pears, but it is better to have it rather strong than light. If it be a brown or yellow loam, it is preferable to a black or dark coloured one. When the soil is naturally a rich one, no manure must be mixed with it, except it be of rather too close a nature, when a little of well rotted vegetable manure and well rotted tanner's bark, may be trenched up with it, in order to make it lighter. Sand would render the soil more friable, but it would in proportion, impoverish it; but the manures directed to be applied, will make the soil lighter, without enriching it too much for the trees. The border should be entirely composed of fresh soil from the surface of a field, or any other land that has not been under cultivation for several preceding years. The soil should not be taken deeper than twelve or fourteen inches, and it ought to be procured eight or

ten months before it is designed to plant the trees in it, and be turned over three or four times; also well broken or chopped in pieces. The border must be fully formed for three months before the time of planting, so that the soil may not settle much afterwards. Particular attention is required in the formation of the substratum of the border. *(See the Chapter on formation of fruit tree borders.)*

I shall first treat of trees cultivated against an open wall:—

The tree must be a maiden plant of the first year after being worked. (It must be pruned previous to planting, planted, mulched, and watered, agreeably to the instructions laid down in the respective Chapters upon each.) The trees must be planted twenty-one feet apart for a wall twelve feet high. This distance will allow the trees to grow for many years without requiring to prune back in any considerable degree the leads of the branches; which would be necessary (if the trees were planted much nigher,) in order to prevent the branches from intersecting one another, otherwise the trees would be injured threby. Also to shorten in any great measure the leading shoots of branches is very injurious, for such trees seldom prosper for many years after such a system is commenced. *(See further remarks upon the subject at the latter end of this Chapter.)* The best mode in which to train

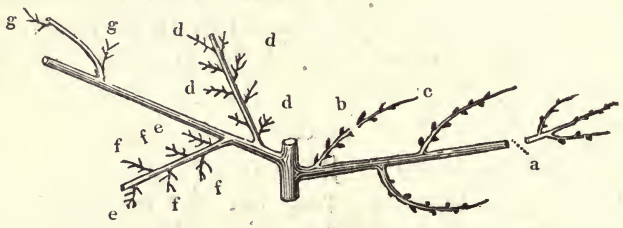
the trees, is the fan method. And if they be pruned and otherwise treated as directed in this Chapter, every advantage will be derived which can be wished, or can be obtained, by any other system of training whatever.

The tree must be headed down at spring, so that six buds are left upon it. When the shoots have pushed, let them be regularly disposed in a fan way by securing them to the wall. Attention must be paid to watering the tops and roots of the trees agreeably to the instructions given in the Chapters upon each. During the summer, lateral shoots will generally be produced upon those six which were trained in at spring, such shoots must be disposed of in the following manner:—If the tree pushes very vigorously, train in all side laterals, and rub or prune off the foreright ones; but if the tree be not very vigorous, only train in the two lowest lateral shoots, and about five inches farther along the shoot, train in two more; thus proceed to train in laterals, and all the intermediate ones must be rubbed off. This regulation must take place when the shoots are about three inches long, and as they advance in growth during the summer, let them be regularly secured to the wall. At the following winter pruning, the leading shoots must be shortened back about one quarter of their length, as a, *Fig.* 1. and the lateral shoots about one-half, as b. Let the cut be made

about half an inch above the bud, and to slope in the same direction with it.

Whatever lateral shoots are produced upon the leading shoots of the branches during the second summer, let them be treated as directed for similar shoots the last year. The shoots which push from the laterals trained in last summer, as c, must be regulated when they attain two inches in length. If the tree shoots very vigorously three, and in extreme cases four of them must be left to each lateral shoot, as d, d, d, d. But otherwise only two, as e, e; all the others, as f, f, f, f, must be rubbed clean off, and the shoot remains as g, g. When a

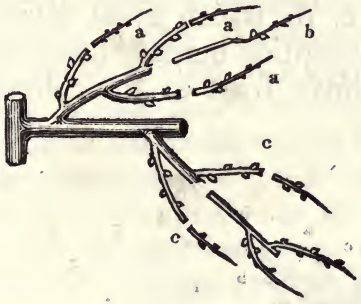
Fig. 1.



shoot does not push laterals in any part where wood is desired, let the end of such a shoot be pinched off about the middle of June, which will cause wood to be produced. Towards autumn, let a few leaves be dressed away so that the wood and buds get well matured. *(See Chapter on thinning the leaves*

of fruit trees.) At the ensuing or third winter pruning, those shoots which were trained in from the lateral ones, as g, d, e, must be regulated. If the tree be very vigorous, three of the shoots, as *Fig.* 2. a, a, a, must be left and the other, b, be cut clean away. But if the tree be not very strong, two must only be left, as c, c. The shortening of these shoots must be according to their strength; if very strong, cut away only about one quarter of their length, but if of a moderate growth, take away one third, and if weakly one half. All other lateral or leading shoots

Fig. 2.

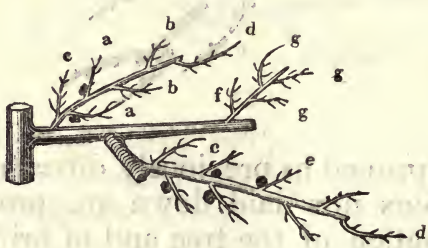


must be pruned as previously directed. The instructions now laid down are proper for the formation of the tree and of bringing it to a bearing condition, I shall therefore now lay down the treatment as proper for a bearing tree; and the selecting and pruning all shoots will be comprised in a summer and

winter regulation. I shall commence with the summer treatment. Previous to the bloom expanding, the tree must be sprinkled over with sulphur and snuff. *(See Chapter on mildew and green fly.)* If the bloom or young fruit require a protection from frost, &c. let a speedy attention be paid to it. (*See the Chapter, protecting the bloom of wall trees.*)

The trees require two hand dressings or prunings. The first as soon as the shoots have got one inch and a half long. In doing which, always leave all shoots that have fruit at their bases, as *Fig.* 3. a, a, but all those that have not fruit so situated, as b, b, must be rubbed off, except the lowest and uppermost shoots, as c, d, which must always be left (with one exception hereafter described) whether they have fruit at their bases or not.

Fig. 3.



If the shoot of last year's wood be from six to fourteen inches in length, the lowest and uppermost shoots must be left; and if there

be no fruit at the bases of the intermediate shoots, they must all be rubbed off; but if it should exceed fourteen inches, in addition to the lowest and uppermost shoots, as c, d, another must remain in the middle as e, although it should not have fruit at its base. If there be one (that has fruit at its base) situated near the place desired, such a one must be retained in preference to one that is destitute. When a shoot of the last year's wood is only five inches, or less in length, and has no fruit, upon it, only leave the lowest shoot, as f, rubbing off all others, as g, g, g; but if there be fruit upon it, the lowest shoot and those that have fruit at their bases must be retained, and all others be rubbed off however they may be situated. The necessity of preserving a shoot at the full extent to which the branch of last year's wood is furnished with fruit, arises from the mode in which the sap is distributed, this being found to be conducted to all fruit and shoots so far as to the uppermost shoot reserved. But on the other hand, whatever fruit there may be above the uppermost shoot retained, it will generally drop off, because the shoot below it intercepts the principal portion of that nourishment which is required to the maturing of the fruit. Also whatever sustenance is received to the tree by the leaves of the new shoot, is consumed partly by the said shoot and by the

fruit which may be at its base; and what is not thus consumed, descends downward into the tree, and the fruit being thus deprived of another portion of its support, drops off, and though in some rare cases a fruit may survive when destitute of a leading shoot above it, yet it never arrives at a proper state of maturity, and is always of a bad flavour. After this first regulation of shoots has been performed, let those which remain, grow without any securing to the wall until the second dressing.

It sometimes occurs that soon after this first hand dressing, the trees will be attacked by the green fly and thrips. Very great attention must be paid to destroy them as early as possible, in order to preserve the shoots and fruit from sustaining injury, which is soon caused by the biting of the insects. And if the shoots are seriously damaged by them at this early stage of their growth, it often spoils them so as to prevent them from bearing fruit the following year, by causing each to make several lateral shoots. (*See remedies in the Chapter on destruction of insects.*) When the fruit has attained the size of large marrow peas, it will be necessary to look over the trees, and where there are two fruit situated together, one of them must be taken away, also any others that may be superfluous, taking care to leave half as many

more as it is designed the tree shall finally mature. *(See the Chapter on thinning of stone fruit.)*

When the shoots have pushed about four or five inches in length, let the trees be again looked over, and if there be any strong luxuriant wood pushing forth, let such be taken clean away, unless it be in a situation where wood is desired, when in that case it must be permitted to grow until it is about ten or twelve inches long and then have the top pinched off, which will cause lateral shoots to push, this practice of obtaining wood in a desired part may be performed upon any strong shoots. The advantage of taking entirely away at so early a season, such luxuriant shoots as are not wanted to remain, is very great. For when they are retained during the whole year, and then at winter pruning are to be cut entirely away as is the practice of many persons, a great portion of sap is thus spent in a useless manner; when by an early removal such loss would have been prevented and the sap have been usefully employed in strengthening the wood and shoots which remain. It is a practice too with many to encourage such luxuriant shoots until about the middle of June and then to cut them entirely away. Such a practice is attended with very bad consequences, for in the luxuriant shoot, the tree found ready means to employ an over

abundance of sap, but when the shoot was taken away as described, a sudden check was thereby given to the new wood which was situated near to the shoot removed, for the channels of such remaining wood cannot always admit the extra portion of sap which is so suddenly deprived of that, in which it was to have been expended; and thus the sap accumulating at the entrance into the shoots, chokes up the passages into them, and the wood being deprived of its proper nourishment, becomes stunted, and if there be a wound or bruise near to such a place, gum will ooze therefrom, which weakens the tree, and is generally followed by canker. But by attending to the directions given, any sudden check is prevented, and the sap will be regularly distributed to the good shoots which are to remain as a supply for next year, and to support the fruit of the present year. For the vessels of the new shoots will more readily expand at such an early stage of their growth than at a more advanced season. The preceeding remarks apply to the occasional luxuriant shoots which push in a regular bearing tree, and not to a tree whose established habit is luxuriant. *(Directions for the treatment of a tree of the latter kind are given in the Chapter, on treatment of vigorous trees.)*

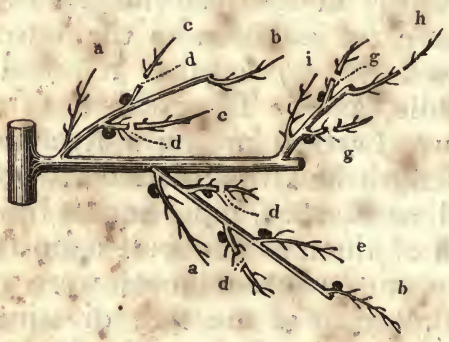
As soon as the fruit is stoned the second regulation of the shoots must be performed.

Upon those shoots of the last year's wood which are from six to fourteen inches long the lowest and uppermost new shoots, as *Fig.* 4. a, b, must be trained to the wall, all the intermediate ones that were retained on account of having fruit at their bases, as c, c, must now be shortened down so as to leave three eyes remaining upon each, as d. If those shoots had been shortened earlier than this time, the fruit at their bases would not have stoned so well, and a great many would have dropped off: but being left until the stoning is effected, they greatly assist in that operation, and by shortening the shoots after the fruit is stoned, the sap is diverted into it and contributes to increase its size. Those shoots of the last year's wood which are upwards of fourteen inches in length must have (in addition to the lowest and uppermost shoots) another retained about the middle, as e. Those shoots of the last year's wood which are only five inches or less in length and that had only one shoot retained, as *Fig.* 3. f, must have it trained in; but such of them as had fruit upon them, as *Fig.* 4. g, and whose shoots were on that account retained at the first dressing, must have the lowest shoot trained in at full length, and the uppermost one, h, must be pruned back so as to leave it about three inches long, and be trained to the wall; any intermediate ones, as g, g, must be cut down

so as to leave three eyes as before directed.

The reason for stopping the leading shoot, h, at this time is, that the lowest one, i, (which is to be retained the next winter pruning) may acquire that strength and maturity, so as to be productive the following year. But if the leading one, h, was permitted still to remain its entire length, and to grow regularly forward during the summer, the lowest one, i, would not attain the state desired. If the tree pushes very vigorously, it will be necessary to leave the shoot, h, its entire length, as done to the lowest; or if wood be wanted in that

Fig. 4.



part and the strength of the tree will admit of its being retained, it must be so; but except in these cases the leading shoot must always be shortened back as directed. A

new shoot will push again after the lead was stopped, when it has got about three inches long, the end must be pinched off so as to leave about half of that part which pushed the last; this may be repeated as frequently as required.

The necessity for allowing the leading shoot to grow until after the fruit is stoned is, that it is very essential in contributing to the stoning of it, but after the stoning is effected, the shoot may with safety be shortened as directed. When a tree is in a weakly condition the shortening of the leading shoots as here directed must always be attended to, whatever length the shoots of the last year's wood may be, the lowest shoots will thereby be strengthened and matured, also, whatever fruit there may be upon the shoot of last year's wood, it will receive its required support.

All the shoots which are to remain and be trained in at this regulation, may be secured by placing small twigs across from branch to branch, those shoots at the extremities of the tree must be nailed in. At this second regulation of the shoots the fruit must also be looked over, and a suitable quantity according to the condition of the tree must be retained; a regular healthy tree to have one fruit every six inches, and a very vigorous or weakly one to have more or less in due proportion. *(See Chapter thinning stone fruit.)*

When those shoots which are trained in, have pushed so that they extend six or eight inches from the wall, let them be regularly laid in as before directed, taking care that they do not crowd each other, which would prevent the wood attaining to the maturity desired. Peaches and Nectarines are greatly improved in flavour by having the full influence of the sun upon them, therefore when the fruit approaches a state of maturity if it be shaded by leaves, let a few of those which hang over it be pinched off; also in late and cloudy seasons when the fruit does not ripen well, if there be the aid of flues, a little fire heat may be applied for a week or two which will facilitate the ripening of the fruit and improve its flavour. Fire heat is also sometimes required to be applied in autumn, especially in late seasons, in order to secure good ripe wood and buds without which resource in cold exposed places, it would not be obtained, the heat required for this purpose should be about that of new milk, and it may be continued for a few weeks, beginning about the first of September.—Thinning away the leaves in autumn in order to admit the sun and air to the buds so that they are matured, is a very essential part in the treatment of those kinds of trees. *(See instructions in the Chapter on thinning the leaves of fruit trees.)* Remedies for those diseases which attack the trees during summer,

are given in the Chapter upon each. (*See Index.*)

It sometimes occurs that the blossoms of the White Nectarine are defective from the stamina being destitute of farina, when this is the case, I always procure some fertile blossoms from some other tree of the same species, and impregnate them by applying the farina to the pistillum of each defective blossom. (*See the Chapter on Pear trees.*)

Winter Pruning.—This must be performed as early in the season as the state of the wood will permit. (*See the Chapter on the best season for pruning fruit trees.*) A judicious management of this part of the business is indispensibly necessary, so that not only a proper supply of fruitful wood be retained for bearing the following year, but also a foundation laid for that which will be required in succeeding years. For if this be not strictly attended to by procuring and retaining wood as near to the origin of each branch as possible, a great portion of the tree would soon become naked and destitute of bearing wood; particularly so towards the centre of it. Such bad effects are very frequently to be seen in trees that have been planted for twelve or fourteen years, at which period they ought to have been in the greatest perfection. I have very often noticed trees that have been planted such a length of time, and some even less than that, which

by a bad system of pruning, had branches near the stem of the tree destitute of bearing wood for two, three, and four feet; and when this is the case, it is with very great difficulty that a suitable supply can be recovered.

The mode of treatment recommended, and practised by some persons, of leaving wholly unshortened at the winter regulation of the trees, all the wood which is retained for bearing the following year, very much promotes the naked state of the branches as before described.

I have tried such a system of management and with all the efforts I could make, I never could keep the tree properly furnished with bearing wood for many successive years, because the leading bud always pushed a shoot the first and then three or four more near the top; and by the sap finding such ready means of being employed in those new shoots, the lower part was nearly always destitute of them. Not only is particular attention required to the obtaining and preserving bearing wood in the situations described, but also in retaining a proper supply for bearing fruit the following year. The distance which I consider best is, to have all the young wood trained at four inches apart, for when they are much nearer than this, the shoots crowd each other, because in summer one or two shoots are required to

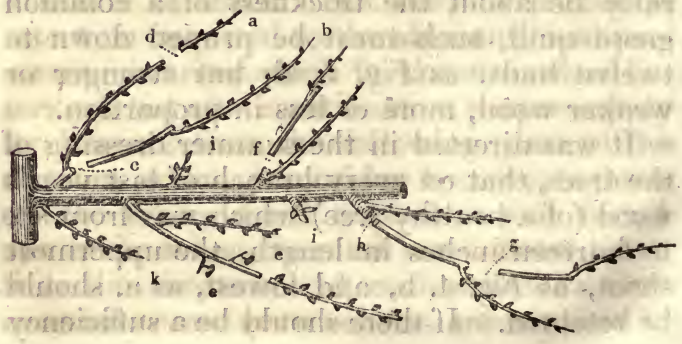
be retained for supporting the fruit which is upon the tree that season, as well as for a supply of wood to bear fruit the ensuing year. And when all such shoots are trained in, they exclude a due portion of sun and air from having access amongst them, from which cause the new wood will be prevented from attaining such a state of maturity as to be productive; also the wood will be much weaker, the fruit smaller, and insects will be encouraged by having so much harbour. On the other hand, by having the bearing wood at the distance I recommend, the tree is preserved from luxuriancy which would be the case if the wood was much farther apart.

In pruning a tree, always begin at the lowest branches, and proceed from the bole of the tree to the ends, branch by branch. The length at which the young bearing wood is to be left, must be varied according to its strength. Healthy bearing wood will generally be about the thickness of a common goose quill, such must be pruned down to twelve buds, as *Fig.* 5. d, but stronger or weaker wood, more or less in proportion.

It was directed in the summer dressing of the trees, that on every branch of last year's wood (of a healthy tree) which was from six to fourteen inches in length, the uppermost shoot, as *Fig.* 4. b, and lowest, as a, should be retained. If there should be a sufficiency

of space upon the wall, so that the new shoots be trained at the distance prescribed, both the shoots, *Fig.* 5. a, b, must be left; but otherwise only the lowest one, as a, and the shoot be pruned off at c. When both shoots are retained, all the short shoots which had fruit at their bases and which were cut down to three eyes during summer, as d, *Fig.* 4. must be cut clean away. Those shoots which were about five inches, or even less in length, and which had the leading shoot stopped in summer, as *Fig.* 4. h, and the lowest one only trained in for a supply, must now be cut down to f, *Fig.* 5. Such shoots as were upwards of fourteen inches long, and which in addition to the uppermost and lowest shoots had another retained about the middle of it, as *Fig.* 4. e, must have two left if there be sufficient space, and be pruned off at g, *Fig.* 5; but otherwise be cut back to h. If there be

Fig. 5.



any short spurs, i, formed upon the two or three year's old wood which is retained, let such be preserved as they will be productive the following year.

It will occasionally happen that a new shoot will have pushed from the three, four, or more year's old wood, as k, such will be produced from a spur, as i, or otherwise. If it pushed vigorously last summer and was stopped as directed in order to cause it to produce kind wood, let a suitable portion of its lateral shoots which have bloom buds upon them, be retained, and be shortened back according to their strength, all others be cut clean away. If the shoot did not require stopping in summer, let it be shortened agreeably to its strength, whether furnished with blossom buds or not. If the retaining such a shoot as is here under consideration, would crowd those that are nearer the extremities of the branches, let some of them be pruned down, so that such a shoot may derive every advantage from being allowed a suitable space, &c.

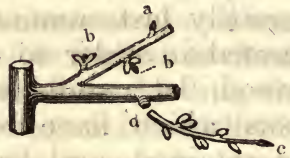
In the pruning of a weakly tree whose leading shoot was directed to be stopped during the summer into shoots, as h, *Fig.* 4. always prune down to the lowest one, as *Fig.* 5. f.

All footstalks of fruit, as e, e, must be pruned clean away.

In pruning the bearing wood always

cut to a growing bud. If there be a single growing bud, as *Fig.* 6. a, situated at the place desired to prune the shoot down to, always cut it off just above such a one, but single growing buds will not generally be

Fig. 6.



found so situated; when this is not the case, there will almost always be a growing bud betwixt two blossom buds, as b, b. But always cut down to a single growing bud if properly situated, in preference to one that is between twin blossoms, because the growing one thus situated will not always push by reason of the bloom buds receiving such a portion of nourishment as to render it defective; but a single growing bud is certain to push a shoot, unless an accident prevent it, in which case, prune down to one of those, being careful to notice that the growing bud is a sound one. Growing buds whether situated singly or between twin blossom buds, are longer and flatter than bloom buds. It will sometimes happen, that short wood will be found to have only single and

double blooming buds upon them, with a growing bud at the end, as c, but no intermediate growing ones. In this case if wood be not wanted at that part, the shoot must be left its entire length; but if wood be required in order properly to furnish the tree, let such a shoot be cut down so as to leave about half an inch of it remaining, as d; there are generally a few embryos of buds around the base of the part left, from which a new shoot will afterwards push. When a tree happens to have a great number of shoots so supplied with blooming buds, one-half, one-third, or one-quarter of them must be cut down as directed, according to the quantity which the tree has, or the portion of new wood required. The necessity of cutting to a growing bud is, that at the ensuing spring a shoot may push at the top of that one shortened at winter pruning, so that whatever fruit there may be below it the following summer, it may have its required support from the tree, otherwise it would drop off or be defective in size and flavour. If a fruit of particular importance happen to be so circumstanced, a bud may be inserted above the fruit, by which nourishment will be derived to it, and it will be matured.

With the view of having a leading shoot to every branch of last year's wood, some persons do not prune their trees until late in spring when they can more certainly discover which bud will push and which will

not. But so many injurious effects result from this practice, that it is advisable entirely to give it up. *(See the Chapter on the proper season for pruning fruit trees).* After a tree has filled its allotted space, the leading shoot of every main branch must always be pruned back to the lowest shoot upon it.

When it is found expedient to cut back part of a main branch, let it be done very cautiously. Always prune close up to a good lateral shoot for a supply, and do not prune farther back than three feet from the end of the branch, for when a large portion of a main branch is taken away, the superabundant sap accumulates at the entrance into the lateral shoots, and the bad effects resulting from it will soon be apparent. There is however a method which I have occasionally practised, when the great part of a main branch has been taken away, it is to open the soil at the distance of three feet from the bole of the tree, and then to sever in two one of the large roots, taking care to cut close up to a lateral one. The consequence has been that the tree was thereby kept in a more moderate state, and afterwards flourished as before the operation was performed. But it is much better to avoid the bringing about any necessity for this process.

In pruning away a large part of any branch in order to make room for new

wood, &c. let the branch be cut close to a good lateral one, which may succeed it, if there be not a good lateral situated as desired, let the branch be cut clean out to its origin, for when a bare stump is left it is a very rare case that a shoot will push from it, but it generally decays, and its injurious effects spread to other parts of the tree.

Respecting the length of time a Peach or Nectarine tree will continue to bear fruit, it will be varied considerably, as the soil, situation, and mode of pruning affect it. But their declining state is generally indicated by an arm or two dying for two or three successive years. These defects will point out the necessity of a succession. Though such old trees may by proper pruning at the top, to a lateral branch for a lead, dressing of the roots, and replanting, be brought to a more flourishing condition than before being taken up, &c. yet they never do so well by a great deal as young ones. And to have good bearing young trees substituted in their places is far preferable to the replanting and otherwise treating old ones, because they will cover the allotted space much sooner, and produce much larger fruit. The method which I practice is, when symptoms of a general decay appear, I procure some young maiden trees and place them in the spaces betwixt the old trees, or against a good aspect in any other part of the garden. Those

trees are headed down, pruned, and otherwise treated as already directed for young trees at the commencement of the present Chapter. If the maiden trees are planted between the old Peach and Nectarine trees, they must be placed exactly in the middle between the old trees. Previous to this the border must be trenched to the bottom and about two yards in extent, from the bole of the young tree, being careful not to disturb the under stratum. In trenching it, let about one-half of the old soil be taken away, and some new suitable soil be substituted in its place. Also mix with it a small quantity of well rotted cow's dung or vegetable manure.

This trenching of the border should be done two or three months previous to the time of planting the trees. After the young trees are planted and begin to spread, a portion from the ends of the branches of the old trees must be pruned away, in order to afford sufficient space for the young ones to be trained. After the trees have been planted four or five years, the old ones may be entirely removed, and all that part of the border which could not be trenched previous to planting the young trees, must now be prepared in the same manner the other was, taking care to let the surface have an inclination from the wall to the front of the border, as directed in the Chapter on making fruit tree borders. If the young trees were

planted at the first against some other wall, and have been trained there until they are in a good bearing condition, they may very successfully be removed and replanted in those situations they are designed to occupy. The border in which they are finally to be planted, must be prepared in the manner before described. In the removal of the trees great care is requisite. Let them be dug up with as great a portion of roots as possible, also with as much soil adhering to them as can be retained. Great care must be taken not to damage any strong roots or branches. (*See the Chapter on taking up and pruning the roots of fruit trees.*) The trees must be planted early in autumn, and be watered at the roots and tops, also mulched, &c. agreeably to instructions given in the Chapters upon each. The pruning must be delayed to the following spring, doing it very early in March, (this spring pruning must only be allowed for the first year after the planting of the trees.) The young wood must at this time be pruned rather shorter than is directed for fully established trees. All Peach and Nectarine trees must be anointed with composition every winter pruning, or as may be deemed necessary, agreeably to the instructions in that Chapter. Remedies for the various diseases with which Peach and Nectarine trees are attacked, may be found in the Chapter upon each respectively.

Of forcing Peach and Nectarine trees.

Peaches and Nectarines may be forced when trained in a house designed for the purpose, or by having them planted in tubs or pots, and introducing them into a Vinery or stove. A Peach House properly constructed, should always have the front wall built upon piers, whether there be trees trained against a trellis at the front of the house or not. Also if there be a flue running lengthwise of the house, it must be built upon piers, and so high that the bottom of the flue be eight or ten inches above the level of the border. This is necessary in order to admit the roots to extend themselves as far as they are inclined to do, without any obstruction. The border must be formed in every respect as directed in the Chapter which treats upon it; and the soil be of the same kind as directed for borders against open walls.

If healthy trees that have been trained for three or four years, and are well furnished with wood, (as recommended for a succession to old wall trees) can be obtained, it is the most expeditious method of furnishing the house to plant such trees; but if such cannot be had for the purpose, let maiden trees of one year old be planted. They must be headed down and regulated in every other

respect until they come to a bearing condition as directed for trees against open walls.

In order to bring the trees to a mature state for bearing as soon as possible, they must be assisted with a little fire heat in spring for the first two or three years.—About the last week in February, let the sashes be placed over the house, and the trees be then headed down, about a fortnight afterwards a little fire must be given so as to raise the thermometer at night to 50 degrees, and in the day time as much air must be admitted as will keep the house at the same temperature. When the shoots push, let the heat be raised in the night to 55, and by sun heat to 62 degrees; as the season advances, more air may be given, and the fire heat be discontinued at the end of April, also when no danger from frost is apprehended, all the air that can be given must be afforded to the trees both day and night.

If trees are obtained that have been trained as described for three or four years, and are in a bearing condition, let them be taken up, replanted, mulched, watered at the tops and roots, agreeably to the instructions given in each Chapter respectively. A little fire heat must be given at the first spring, regulating it as directed for the maiden trees. As soon as the sashes are placed over the trees, they must be pruned and the wood must be cut a little shorter than is directed

for fully established trees. This pruning at spring and cutting the shoots shorter, is only to be practised the first year. Do not let the trees be forced the first year with the view to obtain a crop of fruit, but they may the second year. Should the wood not be well matured at autumn, let a portion of leaves be dressed off; (*see the Chapter on thinning the leaves of fruit trees*) also a little gentle fire heat be applied in order to effect the desired end. The sashes must be taken off at the end of October. The regulation of hand dressing the trees in spring, of shortening the shoots in summer, also of pruning them in winter, and anointing them with composition, must be strictly attended to in the manner laid down for those against open walls. The directions which are required for treating established trees, in addition to those referred to are the following:—

First—*Of Heat.*—When ripe fruit is desired at any particular time, begin to force the trees about eighteen weeks previous to it. Let the sashes be placed over the trees for two weeks before the fire heat is applied, admitting plenty of air during the day, but closing the house at night. If the roots of the trees extend beyond the front wall of the house, let the ground be now loosened to the depth of two or three inches, and some littery manure be placed upon the soil about eight or ten inches deep, and to the extent

it is deemed the roots run. This is particularly necessary, because such a great difference in the temperature of that part of the tree within the house and of the other part outside of it, would operate very powerfully upon the tree, so as to cause the fruit to drop off.

Fire heat being introduced at the end of the second week, let it be regulated so as to keep the wall about new milk warm, and to raise the thermometer in the house to 45 degrees at night, and about the same fire heat in the day time, but admit air so that by sun heat it does not exceed 65 degrees. At the beginning of the fourth week, let the heat be raised to 52 at night and to 68 degrees by sun heat.

When the bloom begins to open, let the fire heat be raised to 55 at night and by sun heat to 68 degrees as before. If the season be far advanced and the heat of the sun be now considerable, very little fire heat must be kept during the day time, only just as much as to allow you to perceive the wall or flue is warm. Were this caution not observed, a great deal of the bloom or young fruit would be injured by the intense heat caused by the sun operating upon the heated wall or flue. The heat last directed must be continued until the fruit is stoned. When this has been effected, it must be increased to 62 at night and to 75 degrees by sun heat,

at which it may be kept until the fruit approaches maturity. The increasing of the heat as directed, must not be done suddenly, but by two degrees in about twenty-four hours, because any sudden increase of the temperature operates very much to the injury of the bloom or fruit. Particular attention is required to the regulation of the heat when the fruit is under the operation of stoning, so that it does not vary from the degree described for that period, either by fire heat or sun heat.

When the fruit begins to ripen, let it be fully exposed to the sun. I consider it the best method entirely to take away the sashes, the flavour of the fruit will be greatly improved thereby.

SECOND—*Of watering the border.*—If the border be not in a very moist state when the bloom begins to open, let the border have a good watering with drainings from the dung-hill. This may be repeated when the fruit is set and the petals have dropped off. Care must be taken that the cold chill is taken off the water applied, this may be done by placing a number of watering pots full, before a fire. Unless this caution be observed injury will be sustained, by causing the fruit to drop off: but during the time that the fruit is stoning, do not give any, unless the border be dry. After the fruit is stoned and begins to swell, let the watering

be resumed and be continued during the season as the state of the border may require until the fruit begins to change, when it must be given up. *(See the Chapter on watering the roots of wall trees.)*

THIRD—*Of watering the tops.*—Soon after the sashes are placed over the trees, let them have a good washing with soap suds; this may be repeated either with soap suds or soft water, once before the blossom opens. When the trees are in bloom, let no water whatever be sprinkled over them, but steam the house by pouring water upon the flue; (if there be not a flue this may be dispensed with,) for steam feeds the bloom. Early in the season the steaming should be done in the morning; but as late as April may be performed at evening half an hour before the sun leaves the house. After the fruit is fully set, let the trees have a washing with soft water, of the same temperature of the house at night; this watering may be repeated every other day, until the fruit is near stoning, when none whatever must be given until that operation be complete; when this is the case, and the fruit begins to swell, watering may be resumed and be continued until the fruit is near its mature size, when it must be given up. Early in the season, let the water be applied just before the sun acts freely upon the house, but later in the

season at evening, about half an hour before the sun leaves the house, at which time the house must also be closed up.

The thinning of the fruit must be attended to as directed for trees against open walls. If the trees be affected by mildew, attacked with the green fly, red spider, or any other disease, or insect, remedies are laid down in the Chapters on each.

The winter pruning of the trees must always be performed as early as the end of October.

All the kinds of Peach and Nectarine trees may be forced in tubs or pots. Young maiden plants prepared as here directed are the best for this purpose. Let the soil in which they are planted be a strong loam, moderately enriched with well rotted cow's dung, or vegetable manure. The tree must be headed down at spring, as is practised with wall trees; and for the first three or four years, should be introduced at spring, into a greenhouse, Vinery, or Peach house, for two or three months, in order to bring the tree to a bearing condition in due time. If there be a border in which the pots can be plunged up to the rim, without damaging the roots of any other tree, let this always be done, as it keeps the soil in a more regular state of moisture. In pruning the tree so as to furnish it with wood, and when arrived at a

bearing condition, let the same directions as are given for wall trees, be strictly attended to, being careful that the shoots are so far apart that they may not rub against one another, which would cause the tree to be diseased. When the trees are introduced into a house for the purpose of being forced, let it be done gradually. If there be a greenhouse into which they can be removed for the first two weeks, it will be advisable to have recourse to it. They may afterwards be removed into a Vinery or other situation, by placing them in the most cool part of the house first, and then in a warmer, as desired. Let the trees be sprinkled over with sulphur and snuff as recommended for wall trees, also anointed with composition after the winter pruning is finished.

When the trees are taken into a Vinery, &c. in order to their being forced, if there be the conveniency of plunging the pots in a border, this must be done, but otherwise let some well rotted cow's dung be placed over the soil at the top of the pot about two inches thick, and some ropes made of moss wrapped closely together all round the sides of the pots. The moss must be sprinkled with water once or twice a day. This will keep the soil uniformly cool, which is essential to the obtaining a matured crop of fruit. Never let the bottom of the pot touch a heated flue. Great attention must be paid

that the trees be regularly supplied with water at the roots so that the soil be kept moist. Let it always be poured upon the soil, and it will descend to the bottom of the pot, but do not have a saucer underneath to hold a supply of water as is the practice of many persons; but which is a very injurious mode of treatment to Peach and Nectarine trees, causing them to drop their fruit and to be attacked by mildew. The water proper to be applied is manure water, from the drainings of a dunghill or otherwise, to be used twice, and then once with pure soft water. This regular proportion must be attended to. Always let the water have the cold chill taken off by placing it in cans before a fire or upon a flue. In sprinkling the tops over with water the same attention is required as is directed for trained trees in a Peach house. When the fruit is stoning let the trees have a great portion of air admitted to them, otherwise the fruit will drop off. When the fruit approaches a mature state and the pots are not plunged in a border, let them be taken out all sunny days and be placed where they will have its full influence, but they must be taken back again towards evening. This will cause the fruit to be of a much more excellent flavour than it otherwise would be, and where there are not many trees is very readily performed. After the fruit is gathered and the new

wood has attained a mature state for bearing next year, let the trees be removed from the house and be plunged in the border of some sheltered and sunny situation. The trees must be pruned at the season directed for trained trees in a Peach house.

Peach and Nectarine trees bear abundantly, and the fruit is generally of a very rich flavour, by being planted out as standards in the middle of a house. The soil and border should be prepared, as already directed for open walls; and the trees must be pruned, watered, &c. as directed for trees against open walls, also leaving the bearing shoots, so far apart, that they will not rub against one another.

CHAPTER XXVI.

The treatment of the Vine, as cultivated in a Vinery or Stove, also as trained against a wall in the open air.

When a house is appropriated solely to the cultivation of the Vine, it is very common to train some up the rafters, and others against a trellis fixed to the back wall. When this is the case, it is necessary to have a border inside the house as well as outside of it.

When a Vinery is properly constructed, it ought always to have a front wall, built so high that the plate upon the wall may be three feet higher than the general level of the soil in the garden. This is necessary in order to let the border have a slope of two feet from the house to the front.

If there be no inconvenience arising from elevating the house as high as desired, the front wall may be built so high that in order to make the border its proper depth, it will not be necessary to sink deeper at the front of the border, than the general soil of the garden; so that when the roots of the Vines have extended as far as the border is prepared, they will be allowed to proceed

forward without any check. *(See observations in the formation of Espalier and fruit tree borders.)*

The border outside the house ought to be at least twenty-one feet broad, five feet deep at the back part, and two feet six or three feet at the front. Particular attention must always be paid to the formation of the substratum, so that the border be well drained. Let the substratum have an inclination of at least one foot from the house to the front of the border. A drain must be made close along the front of the building, and another at the front of the border to run parallel with the house. Other cross drains must also be made, the tops of these drains (which must be open stone drains) must be three inches above the level of the substratum. If the bottom of the border be naturally dry, after the drains are made nothing more is required than to spread about two inches thick of moderate sized gravel, or stones broken small, over the whole of it, which must be rolled to an even surface, but not so as to bind them too closely together. If the bottom of the border be wet, in addition to the drains being made, let about six inches thick of broken stones, brick bats, &c. be spread over the whole substratum; upon these lay an inch or two of smaller stones, or gravel, and let them be rolled to an even surface. This is a great deal preferable to

paving the bottom as is advised and practised by some persons, for the small stones, &c. admit water to filter down to the surface of the natural substratum, and to run down to the drains; but when it is paved, the water runs along the face of the paviers, and a few inches of the compost next to them is very wet, which causes any roots that enter it to decay. After this is completed so that the overplus water can be conveyed entirely away from the border, the compost for the Vines must be laid in the space allotted for it. The sort of compost which I find the Vine to flourish the best in, is prepared as follows. One half of good gritty loam soil, the top spit of a pasture field which has not been lately cultivated for corn, or of a common, let the turf remain upon it; one-quarter of well rotted manure from old hot beds, and one-quarter composed of lime rubbish, bone dust, old spent bark, and pigeon or fowl's dung. Let there be equal quantities of lime rubbish, bone dust, and bark, and about half the proportion of pigeon or fowl's dung.

The soil must be procured twelve months before the time it is wanted for use, and must be frequently turned over and chopped in pieces, so that the turf may become well rotted. In turning over the soil, always do it on a dry day. The manure and the soil must be mixed well together previous to laying it in the excavacation. The compost

ought to be laid in the place alloted for it, three or four months before the Vines are to be planted in it. In filling in the compost, let it be raised a little higher than the wall plate to allow for settling, so that when it is finally settled, the surface at the top may be close up to the wall plate. This is necessary that no part of the Vine be exposed at the outside of the house, as the Vines ought to be introduced through a sloping hole in the wall and to enter the house close to the under side of the plate. A border constructed and composed as directed, will last a great many years, and the Vines will grow vigorously: it will fully compensate for every expense and exertion incurred in its formation. A border thus constructed will do for an outer one to either a stove or Vinery.

I before noticed that Vines are in some cases trained against a trellis, which is fixed against the back wall of the house. When this is the case, a border must be made inside the house, of the same kind of compost as the outer border, and the bottom of the border must be drained as the other; but the surface of it need not incline as directed for the border outside the house.—The front wall must be built upon piers or arches, and if there be a front flue (which is generally required) it must also be built in that manner, and the bottom of the flue be raised several inches above the surface of the

border. The necessity for building the wall and flue upon piers is, that the roots of the Vines may run without any obstruction. The time at which the Vines must be planted, is early in May, providing the plants are in a proper condition; but if not, it may be deferred until the end of the month. Those persons who have the conveniency of raising Vines themselves, may adopt the practice which I pursue, and which is hereafter detailed: viz. to raise them from single eyes; this is done by cutting in a straight direction through the shoot about half an inch below a bud, and then cutting in a sloping direction about one inch above the bud; these planted in good rich soil early in March, fixed firm in the earth, and placed so deep as to cover the eye, then introduced into a stove, or hot bed frame, until they have pushed, will make strong plants the first year. When there is not the conveniency of raising plants, Vines of one year old, propagated from single eyes, may be obtained at most of the public Nurseries. At the end of February, Vines which are one year old must be headed down to one bud, and be introduced into a forcing stove. When they have pushed shoots about three feet six or four feet in length, let them be removed into a green-house or some cooler apartment than they were previously in, this is necessary, that the Vines do not re-

ceive a check by their removal for final planting, after they have been thus prepared for two or three weeks, they may be planted. In performing this, let holes be made in the border opposite each place where the Vines are to be introduced into the house. Let the holes be made about three feet wide and about fifteen inches deep. In these put a portion of fine light compost so as to raise it to the height at which the Vines are to be placed. The Vine must have all the leaves dressed off which are upon that part of the stem which will be outside the house. When the plant is turned out of its pot, it will probably be found that the roots are matted closely together round the outer side of the ball of earth. Before the plant is laid in its place, let these matted roots be loosened, so that they can after being planted, push directly forward into the border. In placing the Vine in the hole, let the ball of earth be laid upon its side, so that the buds upon the stem are in the direction afterwards required for making an incision as hereafter described. The ball must be placed so far from the front wall, that five eyes of the new shoot lying horizontally upon the earth in the hole may be at the outside, the top of the Vine being introduced into the house through the opening in the wall. Let the Vine thus placed, be supported by a portion of fine compost applied at the sides of the ball, so

that it will be secured in the place in which it is to remain. The Vine must be placed so deep in the hole that the upper side of the ball be six inches below the surface of the border, allowing two or three inches for settling.

When it is thus placed and whilst the stem is bare, let a slit be made below each bud, beginning about an inch from them, and making it up to the buds; the buds which are to be treated thus are those three that are at the low side of the stem, but the two remaining ones at the upper side must not be meddled with. In making the slit, cut into the shoot about one-third of its thickness. When the three tongues are cut, let a little of the soil be put between them and the other part of the wood, so that the tongue will form an angle of 45 degrees with the stem. After this is done, the whole of the Vine outside the house may be covered up with fine compost as before described. In making the tongues, be very careful that the Vines are not broken, as they are very brittle. When they are thus planted, let them be watered and mulched. The same method of planting Vines must be practised upon those that are planted for training against a trellis at the back of the house. The advantage of slitting the stem in the manner described is, that a great number of roots will be produced from each tongue,

which consequently increase the number of feeders to the plant, and will contribute in a great measure to promote the vigour of the Vine. I have had Vines that made shoots the first season three inches in circumference, and some few more than that.

After the Vines are planted, let a little fire heat be given so as to raise the thermometer at night to 55 degrees, but by day admit plenty of air. When they have struck root, which will be perceived by the shoots pushing, let the heat be raised to 68 at night, and to 75 degrees by sun heat. The fire heat may be continued until the beginning of July, when it may be given up. As the Vines advance in growth, be careful to secure each lead to the trellis, that it be not broken, as it ought not to be stopped until it has reached the top of the house. When it has got to that extent, train it horizontally for about three feet, when it must be cut back so far, as to leave four or five buds upon that part trained horizontally; this will strengthen the upright shoot considerably. If a shoot pushes again, let it grow a foot or two and then be cut back to within two or three joints of where it was stopped the preceding time. All laterals that are produced upon the Vine must be taken off when they have pushed about six inches in length. In doing this, pull them off backward from the bud. The reason for taking

away the laterals is, that the natural fruit bearing buds are frequently injured by their being left and pinched back once or twice during summer, as is the practice of many persons, so much so sometimes as to force the natural buds in a wrong direction, or even to destroy them by growing over. The reason of laterals being retained and pinched back as alluded to is, to prevent the natural fruit buds from prematurely pushing; but if the leading shoot be kept growing forward as directed, the buds will not either prematurely break or be injured, on the contrary will be a great deal bolder, and produce much finer fruit the ensuing year.

In pruning and training of Vines, I practice two methods. Under the first, the Vine produces its fruit principally upon spurs; but under the second, upon long shoots of the year old wood. In pursuing the first method I have a much greater number of bunches upon the Vine, than in the latter; but under the second method, the bunches of fruit are considerably finer.

The second method I consider the best to adopt, when Vines are trained in a house where there are Pine plants cultivated, because by it, a much greater portion of light is admitted than can be done by spurring the Vines. But when a house is principally appropriated to the culture of the Vine, the mode of spurring is most proper to be prac-

tised, because they can be allowed to spread wider on each side of the rafters, and when spurred they require a greater breadth than on the other plan. Never permit them to spread over all the roof, although they be spurred; but always leave a space of twelve or fifteen inches up the middle of each light, so that the sun will be admitted in order to bring the fruit to perfection.

I shall first treat upon those Vines which are spurred. The method of treating the Vine during the first summer which is already laid down, is alike applicable to both the modes of treatment. I shall therefore commence with the first winter pruning, which must always be done in November, providing the wood be ripe, which will be known by its brown colour and the leaves dropping off.

First Year.—Winter Pruning.—In pruning the shoots always cut about one inch above a bud, and so as to slope in the same direction in which the bud grows; the length at which the shoots are to be left must be regulated according to their strength. If the shoots are as much as one inch and a half or upwards, in circumference, let them be cut back so as to leave four feet in length of the new wood inside the house. But if the shoots are much less in circumference, let them be pruned down to two buds. As soon as the

Vines are pruned, let those that are long enough to admit of it, be loosened from the rafters, and be tied along the front of the house, as near to the bottom of the sashes as possible; also if there be Vines trained up against the back wall, they must be brought down as much as possible to an horizontal position.

The border outside the house (as far as it is judged the roots of the Vines extend) must be covered with rotted tanner's bark or littery manure; but previously to laying this upon the border, loosen the soil to the depth of two or three inches, but not more. The mulch thus laid must remain upon the border until the latter end of May, when it may be removed.

The advantage of having recourse to this practice is, that those roots which run near the surface are protected and preserved from injury by frost. And when the forcing is commenced it is of great importance, in order that the roots may be as much as possible in a natural proportion of temperature with that part of the Vine inside the house. No fire must afterwards be admitted into the front flue until spring; but if there are other plants in the house which require to be preserved from frost, a little fire heat may be permitted in the back flue for that purpose; where it can conveniently be done, it is the

best to remove the Vines outside of the house, or to take the sashes away as soon as the Vines are pruned.

The time of commencing forcing the Vines the following spring, must be regulated by the period at which it is desired to have ripe fruit, allowing sixteen weeks from the commencement of forcing to the ripening of the fruit; but the nearer it is to the period when the Vines naturally begin to vegetate, the more cerain is an abundant crop of fine fruit to be obtained.

When forcing is commenced, if the sashes have been removed from the house, let them be replaced a week or more previous to any fire heat being applied; also if the border outside the house is not in a very moist condition, let it now have a good watering with drainings from the dunghill. If there be a border inside the house, it must also be watered at the same time.

This attention to watering must be practised occasionally, so as to keep the borders in a moist (but not wet) condition, until the fruit is better than half swelled, when it may be entirely given up for that season. If manure water cannot always be had for this purpose, soft pond water may be used instead. As soon after as it is remarked that the buds have begun to swell, let a little fire heat be introduced, so as to raise the thermometer to 60 degrees.

From the time of commencing the fire heat, until the bunches of fruit can be distinctly seen, (which will generally be the case by the time the shoots are an inch or little more in length) the Vines must be sprinkled with water of the same temperature as that in which the house is kept. The sprinkling must be performed every day at morning, noon, and night. When done at the evening, let it be about half an hour before the sun leaves the house. The flues must also be regularly watered every morning and evening. Care must be taken where a flue is very hot and near to the Vines, that no water is poured there at such a time, as the steam arising from such places would probably scald the Vines.

As soon as all the buds upon the Vines have broken, let the Vines be tied up the rafters of the house, and the heat be then increased to 65 degrees. In increasing the heat of the house at any period of forcing, let it be done as gradually as possible, by a degree or two in a day. After the Vines are tied up the rafters as directed, they must only be sprinkled twice a week until the bunches come into bloom, when it must be entirely given up, but must be resumed after the berries are set, by sprinkling twice a week until the berries are about half the size they will attain to, when it must be given up, otherwise they would be affected by

mildew. The steaming of the house must be at this time regularly attended to morning and evening, although the sprinkling be given up; and it must be continued until the berries begin to change colour.

It will generally be the case that two or more bunches of fruit will shew from every bud, but only one must be permitted to remain. Whatever fruit is shewn upon the uppermost shoot must be pinched off, unless the Vine be very vigorous, in which case it may be left as in the other shoots. In making choice of a bunch to remain, the lowest one is generally the best. When the shoots upon which fruit is retained, have pushed forth so that two joints can be distinctly seen above the bunch, the top of the shoot must be pinched off just above the second joint, in order to divert the course of the sap into the bunch of fruit; if a shoot should push again from the top of the one thus stopped, let it be pinched back to its origin when it has got about six or eight inches long. After this second stopping it will rarely be necessary to be repeated, the fruit being then so increased in size as to require a great portion of support. Great care must be taken that the leaf, (which is at the joint from which the bunch is produced) is not damaged, for if it be, the fruit will be injured.

The necessity of stopping the shoot two

joints above the bunch is, that the sap, when required, may have a channel to expend itself without causing any of the buds below the bunch of fruit to break this season, which would frequently be the case in vigorous Vines if the shoot was stopped at the bunch, which is the practice of some persons; but by stopping it as directed, a mean is provided to prevent the premature breaking of the buds below the fruit, whilst the part of the shoot retained above the bunch is not an incumbrance productive of any injury to the Vine or fruit whatever. When the bunches come into bloom, the temperature of the house must be increased to 70 fire heat, and 75 degrees sun heat, admitting as great a quantity of air in mild days as possible, so as to regulate the house as described. This temperature of heat must be afterwards kept until the early part of June, when fire heat may be given up, except a little occasionally, to dry up any damp.

The thinning of the berries must take place as early as possible, doing it when they are the size of vetches, or small garden peas. In doing this, great care must be taken that the berries which are to remain, and the stalks which support them, are not injured by the scissors, with which the thinning is performed. A regular distribution of berries in every part of the bunch must be left. The distance at which they are permitted to re-

main, must be varied according to the sort of Grape; those sorts which produce small berries, must be left the rankest. Those bunches which have shoulders (such as the Black Hamburgh and others) must have them supported to the Vine or trellis, previous to thinning, by small strands of matting. This gives a great advantage to the swelling of the berries, and secures them from getting mouldy. All laterals or claspers which are produced, must be taken away, leaving about one inch of each clasper, but taking the laterals entirely away.

The uppermost shoot must be trained up to the top of the house and then in an horizontal direction for a few feet; it must then be stopped agreeably to the instructions given for the first year.

Those Vines which were cut down to two buds at the winter pruning must be regulated in the following manner. If both the buds pushed a strong shoot each, let the uppermost be taken clean away, and the other be trained up the house, and afterwards treated as directed for young Vines the first year after being planted. At the following winter pruning the Vine must be shortened back to four feet, and in its future treatment be regulated agreeably to directions given for the other Vines which were allowed to remain four feet long at the first winter pruning.

Second Year.—Winter Pruning.——When the Vines are pruned at this time, the lateral shoots, which will hereafter be denominated spurs, must be cut down to two buds, as *Fig.* 1. a, a, a. By shortening those spurs so much as directed, the Vine is kept in a vigorous state, and the bunches of fruit will be considerably larger than if they were left longer. But it is necessary to leave two buds upon each spur, for it sometimes happens that one of the buds will not shew fruit well, or may be damaged, but by reserving two, a supply is more certain. The leading shoot of the Vine must be pruned back so as to leave five or six feet in length of the last summer's wood. This must be regulated according to the length of the rafters. If

Fig. 1.

the Vines are to be trained to the length of fourteen feet, it must now be pruned to five feet, and the year following to five feet more, when it will be at its desired extent. If the

extent at which the Vines are to be trained be as much as seventeen or eighteen feet, let the leading shoot be pruned so that it may have a regular proportion left each year, and so as to reach one foot from the top of the house at the fourth winter pruning. At which length the Vine must in future be allowed to bear fruit. Any loose bark which there may be upon the Vine at winter pruning, must be peeled off. Also the Vines must be anointed with the proper composition. *(See Index.)*

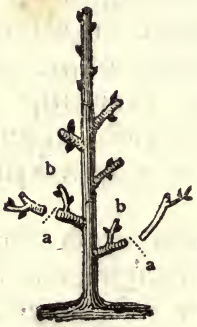
After this is done, the Vines must be brought down to an horizontal position as before. The bringing down of the Vines to this direction must be attended to so long as they will admit of it, as it greatly assists the regular breaking of the buds at spring. The directions given for forcing are those proper to be pursued in every succeeding year.

When the buds upon the spurs, a, a, a, have broken, and shew good bunches of fruit, one only must be left to each shoot. If the uppermost bud does not shew fruit, let it be taken entirely away; but if the uppermost bud shews fruit and the lowest one does not, both of them must be retained.

The directions already given for stopping the shoots, taking away claspers, laterals, &c. must be attended to in every succeeding year.

Third Year.——*Winter Pruning.*——Those spurs which had two shoots retained upon each during the last summer, must now have only the lowest retained, and each spur must be pruned off, as *Fig.* 2. a, a. The shoot, b, must also be cut down to two buds. This attention to keep each spur supplied with bearing wood as near to the main stem of the Vine as possible, must in every future pruning be strictly pursued. The leading shoot must now be cut off agreeably to previous instructions.

Fig. 2.



When the Vine comes to bear upon spurs quite to the top of the house, the leading shoot must be stopped in summer, and also pruned back in winter, in the same manner as is practised upon the spurs. When the top of the house becomes crowded, a portion must be taken from the end of the Vine by

cutting away two or three feet of the old wood, and replacing it by a new shoot.

When the Vines have been under this mode of training and pruning for ten or twelve years, the spurs will generally be rugged and longer than would be sightly or beneficial to the Vines, a renewal of wood will then be required. But this may in many cases be retarded for several years, for it will very frequently happen that upon the oldest wood of the spurs several buds will break, as well as the two buds reserved upon the shoot of last year's wood. When shoots are so produced upon the old wood, let all be rubbed off to one good strong one, when they are about two inches in length. The one retained must be allowed to grow to fourteen or sixteen inches in length when it must be stopped, and afterwards kept at that length. When such spurs as are furnished with a shoot as described, are pruned at the following winter, all that part of each spur above where the new shoot arises, must be cut clean away, and the new shoot be pruned to two buds as directed for the other spurs.

However, when it is found necessary to have an entire new head, this is best effected by wholly cutting down the Vine, so as only to leave two or three buds inside the house. There are generally plenty of such buds situated upon the old wood at the bottom of the Vine. This practice is far preferable to that

of training up a shoot from the bottom a year or two previous to the time it is designed to cut down the Vine; for in that case the shoot cannot always attain sufficient strength to enable it to produce fruit as it ought to do for the first year or two after heading down, by reason of having to support spurs and fruit at the same time the shoot is coming on, and upon which you are to depend for a supply. But when the Vine is cut entirely down, it will make a vigorous shoot which will bear abundantly the second year. In pruning the shoot produced by heading down, let it be cut at the first winter pruning, so as to leave it six or seven feet long; and at the second winter pruning in proportion to its strength: the future treatment of them must be as directed for young Vines.

The other mode of treating Vines which are cultivated in a stove, (before alluded to) is according to the following manner:—

The Vines are planted in the manner already described, and the treatment of them for the first summer is in every respect as for Vines trained to bear upon spurs.

First Year.——Winter Pruning.—It will occasionally happen that some of the Vines will grow a great deal more vigorously than others. In pruning them at this time they must be treated according to their strength. If the shoots be so strong as to be two inches

in circumference, let them be shortened so that four feet of each shoot remains inside the house. But if the shoots be much less than two inches in circumference let them be cut down so that only two buds be left upon each Vine inside the house. After being thus pruned, the Vines will require in every other particular the treatment before directed.

When the Vines push at spring, those which were pruned to four feet in length may be allowed to bear fruit this summer; but those which were cut down to two buds must not be permitted to bear any until the third summer from planting.

Upon those Vines which are to bear fruit, every bud will generally shew two or more bunches; but only one to each bud must be suffered to remain, with the exception of the uppermost and lowest shoots upon the Vine, both of which must be entirely divested of any fruit which may be upon them, as they are to be trained, in order to furnish wood to bear another season. The uppermost shoot must be allowed to grow to the top of the house and a little in an horizontal manner, and then must be stopped as directed before. The lowest shoot must be permitted to grow to the length of seven feet, and must then be stopped by cutting off the top so far back as to leave it only five feet long. By cutting the shoot so far back, it will be con-

siderably more strengthened than if the top of the shoot had been pinched off when it had reached the length of five feet; because in the former case, the wood having attained a little hardness, the buds will not push a new shoot so soon as where the shoot is very tender, as in the latter case; thus a greater space of time is afforded for the strengthening of the shoot. The shoot thus stopped must be kept at this length by stopping the new shoot after it has pushed a few inches; this must be repeated as frequently as required. Those shoots which are allowed to bear fruit must be stopped at the second joint above the bunch as soon as two joints can be distinctly seen, and when they push again, they must be permitted to grow a few inches and then be pinched back so as to leave one bud upon that part of the shoot which pushed the last; this must be repeated as frequently as required. Those shoots must regularly be tied up to the main stem of the Vine, so that they may not crowd each other, and on the other hand, not shade more than can be helped such trees or plants as may be underneath them. All claspers and laterals must be taken off in the manner already described.

If both the buds pushed a shoot of those Vines which were last winter pruning cut down to two buds, let the uppermost be stripped off, and the lower one be trained up the rafter; and afterwards treated in every

respect as directed for those which pushed vigorously the first year after being planted.

Second Year.—Winter Pruning.—Let the leading shoot of those Vines which produced fruit be shortened, so that six feet of the wood made last summer be left, as *Fig.* 3. a. The lowest shoot must be pruned down to four feet, as b, which will be opposite to where the leading shoot was cut to the first winter pruning. By shortening the shoots as here directed, all the buds will generally push strong shoots, and shew good bunches of fruit the spring following; whereas if they had been left two or three feet longer, it would be uncertain whether some of the

Fig. 3.

buds at the lower part would push shoots, which if they did, would be weakly. But every desired advantage both as to fruit and wood is obtained, by pursuing the directions given. All those lateral shoots which pro-

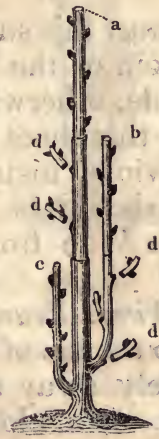
duced fruit, as c, d, must be cut clean away to the stem which they proceed from.

The following summer the Vines will bear fruit for the length of ten feet, and two bunches of fruit may be allowed upon each bud, all others must be pinched off. Each uppermost new shoot upon the shoots, a, b, of the last year's wood, must not be permitted to retain any fruit whatever, but the uppermost new shoot upon the shoot a, must be trained to the top of the house and be stopped as before directed. Also the uppermost new shoot upon the shoot b, must be allowed to grow to nine feet in length, and then be stopped by cutting away two feet off the end, at which length it must afterwards be kept during summer. It will generally happen that there will be several buds break from the oldest wood of the Vine, and very near to the bottom, in which case a shoot must be retained and trained up at the opposite side the main stem of the Vine to the shoot b, all other shoots which arise near to the origin of this must be rubbed off when about one or two inches long. If a shoot does not proceed from the old wood, the lowest new shoot upon the Vine must be trained in for the same purpose. This shoot must be allowed to grow about seven feet long; and then be stopped by cutting off the top to five feet, as before directed to the lowest shoot last year.

Third Year.—Winter Pruning.—The uppermost shoot or lead of the Vine must now be cut off so as to leave six feet of the wood made last summer, as *Fig.* 4. a. This will very probably be near the top of the house, if it should be so, a foot longer or shorter may be allowed so that the Vine answer the desired end in coming as high up as wanted, which ought to be about fifteen or eighteen inches from the top.

The second shoot upon the Vine must be cut back so as to leave six feet of the new wood, as *Fig.* 4. b. And the lowest shoot be pruned down to four feet, as c.

Fig. 4



All lateral shoots (whether they bore fruit or not last summer) must be cut clean away, as d, d, d. When the Vines break the ensuing spring they will have three different bearing shoots, as a, b, c, which will

probably extend to the top of the house, being sixteen feet in a bearing condition.

The uppermost shoot upon the Vine must this summer be allowed to retain two bunches of fruit, the same as all other bearing shoots. The bunches being retained upon the top shoot prevent its growing so vigorously as it otherwise would. The top shoot must be stopped in the same manner as all other bearing shoots.

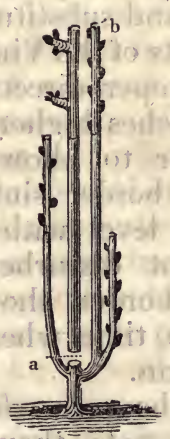
The top buds upon those two shoots which supply fruit at the lower part of the Vine, as b, c, must not have any fruit left upon them, but be trained up to furnish wood as already directed.

Another shoot must this summer be trained up from the bottom of the Vine, (from the old wood if possible, otherwise as low down as it can be had) this shoot must be treated according to previous instructions. It is desirable that it should be trained up the opposite side of the Vine from the last shoot trained in.

Fourth Year.—Winter Pruning.—The shoot which bore fruit to the top of the house, must now be cut entirely away to the bottom of the Vine, as *Fig.* 5. a, close to the point from which the next shoot in length proceeds, as that is to supply the place of the one taken away, and must be shortened to the extent the Vine is to bear, as at b. All the other shoots must be pruned off at their re-

spective lengths, agreeably to the instructions previously given; also, all the lateral shoots must be cut clean away, as before directed. When shoots are produced upon the old stems from which the lateral shoots were cut away, if they are not wanted for a supply of wood, let them be rubbed off when they are an inch long.

Fig. 5.



This treatment of the Vine may be practised for a great number of years, and under it will always be properly furnished with wood and be in a good bearing condition. The principle object is to obtain a supply of young wood as low down the Vine as possible.

When through weakness it is deemed necessary to renovate the Vines, they must be cut entirely down to one or two buds, and afterwards be treated as young Vines.

The Vine border must also be renewed when required, by an addition of fresh soil and manure in the same proportion to each other as directed for a new border. In performing this, begin to open a trench at six feet from the house, to the front of the border, and be careful not to bruise or break more roots than cannot possibly be avoided. Take a considerable quantity of the old compost entirely away, and substitute new instead of it. Lay the roots of the Vines carefully upon the soil in a proper direction, placing them eight or ten inches higher than they were before, in order to allow for settling, so that when the border sinks they may be at their proper level with the other roots which were not disturbed. Such a renewal of the border should always take place about the time when the Vines are pruned at autumn.

Grapes may be successfully obtained by forcing them in pots, they will require the same regulation of heat as already directed for forcing Vines, they must also be sprinkled over the tops as Vines in a Vinery or stove, and be watered at the roots as directed for Peach trees in pots. The Vines must be allowed to bear upon spurs, and as many may be retained, as can be permitted without interfering with each other. In pruning them, let all spurs be regularly cut down to two buds each, and they must be stopped

in summer two joints above the fruit, at which length they should be kept. A few leading shoots must be allowed to grow three or four feet in length during summer, and then at the following winter pruning be cut back to two buds. All laterals and claspers to be taken off as already directed.

The following observations apply to the treatment of the Vine as trained against an open wall. The border is to be composed of the same kind of compost, and be prepared in the same manner, also the Vines be planted according to the directions previously given for those cultivated in a Vinery or stove. The time for planting the Vines must be as early in spring as may be, when no danger from frost is apprehended. The distance at which they are to be planted from each other must be for a wall twelve feet high, twelve feet apart.

In order to bring the fruit to perfection in the colder parts of the kingdom, it is requisite to have the Vines planted against a flued wall, also to have the wall coloured with coal tar or dark coloured paint. If the wall be flued it is necessary that a trellis be fixed against the bottom of it, and to come as high up, as the top of the first flue. After the Vines are planted, let a little fire heat be applied at nights and continued for two or three weeks, when it

may be given up. As the Vines push forward let them be carefully trained straight up the wall, and if they reach the top let them be stopped, also all claspers and laterals must be taken off agreeably to the instructions for Vineries and stoves.

First Year.—Winter Pruning.—The Vines must be cut down to three buds; also be mulched, &c. as directed for Vineries or stoves.

As soon as the buds begin to burst the following spring, a little fire heat must be given, so as to make the wall about new milk warm, also if the weather be severe a covering should be placed over them. The woollen nets recommended for Peach and Nectarine trees, are the most suitable for this purpose. This covering as well as the fire heat, must be continued so long as danger is feared from frost.

If all three buds push shoots, let the two uppermost be retained and rub the lowest one off, and if there be any bunches of fruit shewn, let them be pinched away. The shoots must be trained horizontally for six feet from the bole, one on each side; at that distance the direction of the end of each shoot must be changed, so that they may afterwards run straight up the wall. After they have pushed three feet in the erect position, let about two feet be cut off the end of each shoot, and when they push again

and have grown a foot or two, let them be stopped. All laterals and claspers which are hereafter produced upon the Vine, must be taken away as already directed.

Second Year.——Winter Pruning.—Both the shoots must be pruned back to that part which is in the horizontal direction, so that each will be six feet long from the bole of the Vine. After the Vines are pruned let them be anointed with composition *(See index.)* This attention to anointing the Vines and washing the wall, must be regularly attended to in every future year.

When the buds begin to burst at the following spring, let a little fire heat be given, which must be continued until the berries are set, also the Vines be covered as directed last year. This attention must be paid every future year. When the shoots have pushed about two inches long, they will require the following regulation. The endmost shoot upon each of the branches must be trained straight up the wall, other shoots must also be trained in that direction, at ten inches apart from each other; therefore proper shoots for training in the manner directed must be reserved, and all intermediate ones rubbed off. The shoots retained must be allowed to grow to the top of the wall, and then be stopped. All shoots in future must be stopped at the top of the wall as here directed, and if they push a second time be stopped again.

All bunches of fruit which are shewn upon the shoots trained in, must be retained, and when the berries are at a proper size the bunches must be thinned. When the fruit is beginning to change its colour for ripening, a little fire heat should be applied until the fruit be ripe, as it contributes very materially to improve the flavour and to increase the size of the berries; also to bring the wood to a proper state of maturity.

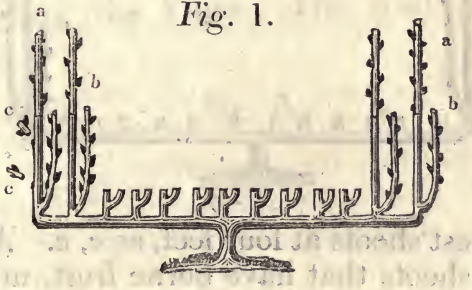
Third Year.——*Winter Pruning.*——The upright shoots must now be cut down so as to leave them four feet long.

All the bunches of fruit which are shewn the following spring must be retained, excepting upon the lowest new shoots, which must be trained close up the side of each mother branch. When they have attained six feet in length, they must be stopped by cutting off twelve inches, and afterwards keeping them at that length. Also the uppermost new shoot upon each branch must be trained straight up the wall, and be stopped when they reach the top. All the other shoots upon the branches must be stopped at two joints above the bunches of fruit, at which they must afterwards be kept. These lateral branches must be nailed regularly to the wall, and the fruit must have the same attention as before laid down.

Fourth Year.——*Winter Pruning.*——The

shoots a, a, *Fig.* 1. must now be cut down so as to leave four feet of the wood made last summer; and the shoots b, b, must be cut off opposite to where each leading shoot was pruned to last year, which will be four feet long; all the lateral shoots which bore fruit last summer must now be cut clean away, as c, c.

Fig. 1.

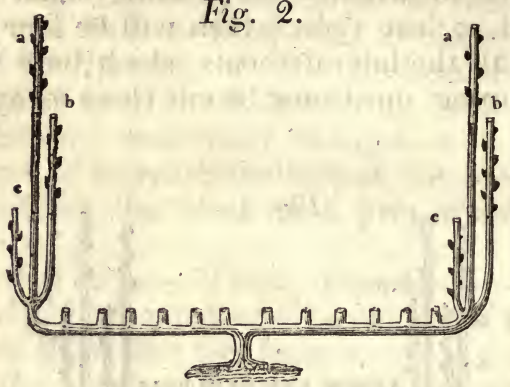


During the following summer another shoot must be trained up from the bottom of each of the leading branches, and it must be stopped as done to the one trained from the bottom last year This shoot must be trained up at the opposite side of the branch from the other. The second shoot in length must be permitted to grow about six feet and then be stopped, by cutting off one foot from the end, at which length it must be kept, and the leading shoot be stopped at the top of the wall.

Fifth Year.—Winter Pruning.—The leading shoots must be cut off at twelve inches

from the top of the wall, as *Fig.* 2. a, a. The second shoots opposite to where the leading ones were cut last winter pruning, as b, b, and

Fig. 2.



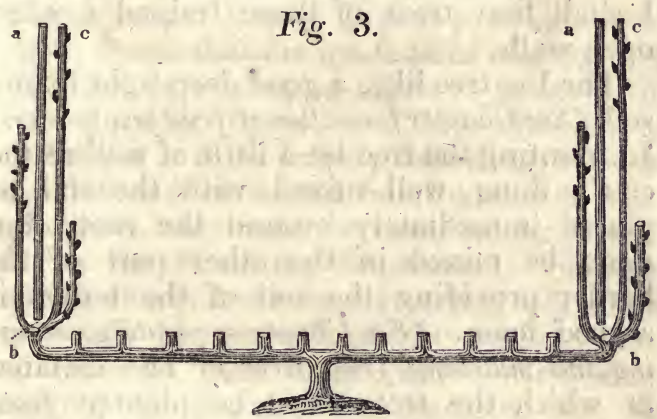
the lowest shoots at four feet, as c, c. All the lateral shoots that have borne fruit, must be cut entirely away. During the ensuing summer another shoot must be trained up from the bottom of each branch, at the opposite side to the one trained up last summer. The other shoots must be regulated as already directed.

Sixth Year.—Winter Pruning.——All the leading shoots, as *Fig.* 3. a, a, must now be cut entirely away to the origin of the next shoot in length, as b, b; and the next shoot in length, as c, must now be pruned off one foot from the top of the wall. The other shoots to be cut down according to previous instruction.

All lateral shoots which bore fruit to be cut clean away.

The system of management now detailed must be practised every future year, by shortening the shoots, cutting away entirely the lateral ones that bore last season, also in training up young ones from the bottom of the branches every year; and it may be pursued for a great many years without exhausting the Vines. The fruit will be

Fig. 3.



considerably finer by treating the Vine in this manner, than if it was spurred as is generally the case. When it is required to renew the Vines, the upright shoots may all be cut down to about two buds from their origin. The border may be also renewed in the manner directed for stoves or Vineries.

CHAPTER XXVII.

On the Fig Tree.

THE Fig is cultivated in houses appropriated to the purpose, or is introduced in pots, into stoves or Vineries, also trained against open walls, and in some very favourable situations may succeed as a standard. I shall first treat of those trained against open walls.

The Fig tree likes a good deep light loamy soil. *(See Chapter formation of fruit tree borders)* In planting the tree let a little of well rotted cow's dung well mixed with the soil be placed immediately around the roots, but none be mixed in the other part of the border providing the soil of the border is a good loam. *(See Chapters, planting, watering, and mulching fruit trees.)* The distance at which the trees must be planted from each other is for a wall twelve feet high, eighteen feet apart. The form in which they should be trained is the horizontal, as the trees will thus be more fruitful than when trained more erect, but in those cases where the trees trained horizontally are still too luxuriant, let the branches be trained in a pendulous manner, and the more lux-

uriant the tree, the greater must be the declination. In pruning and training the Fig tree, (as in other fruit trees,) the great object must be to keep a regular supply of young wood in every part. The shoots must be trained so far distant that the sun and air will be properly admitted to every part; in those kinds that have very large leaves the distance must be twelve or fourteen inches at least. The Fig tree shews two or three fruit at the ends of the spring shoots, but which do not always ripen well. The principal crop of Figs is produced upon those shoots that are made after midsummer, therefore care must be taken to preserve the fruit through winter, and they will come to perfection in June or July following. When a sufficiency of lateral bearing shoots is not produced, they may be obtained by attending to the following directions. When the spring shoots have done growing, which will generally be the end of May or beginning of June, let each shoot (where wood is required) be stopped, by pinching the end betwixt the finger and thumb, so hard as to feel that the shoot gives way to the pressure, but not so as to break it; this will cause shoots to push below where it was stopped. If a shoot thus desired to be stopped be a long one, let it be bruised or broken nearly in two about the middle, or a piece of string be twitched very tight round it, and the end

of the shoot above the string be brought nearly parallel down by the side of the remaining part of the shoot, and this will cause shoots to push where desired. Those lateral shoots generally shew plenty of fruit during the months of August, September, and October, but appearing late in the year, they will not ripen in this country the same season; but some of the fruit will attain to half their size or more. Such as attain to the size referred to, or even if much larger than a large marrow pea, will very seldom survive the severity of winter. This being almost universally observed, it is a very general practice at the end of Autumn to take away all Figs that are the size described. This removing of them is certainly proper, but they ought to be taken away at a much earlier period, even as soon as they were discovered to be Figs. By doing so the sap is diverted to the formation of one or occasionally two embryo Figs at the side of the fruit removed, and which will be so small as to escape injury by covering them during winter, but will ripen well the following summer.

During summer the soil of the border must be kept well watered, and the regulation of the shoots as before directed be attended to.

Previous to frosty weather setting in, the trees will require to be covered in order

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to protect them from the severity of winter. This protection is more necessary in the cold parts of this country, than in the warmer parts, where it is scarcely required at all. In covering them it is proper to use no more than is absolutely necessary, for when they have had a very thick covering during winter, the branches are so tender that when it is taken off in the spring, the check they then receive is very injurious and diminishes the fertility of the tree. The covering used must be proportioned according to the cold or warmth of the situation. Broom is a very excellent article for this purpose; let it be soaked in soap suds and urine for twenty-four hours and then be dried again before using. Always let the broom be well secured to the wall so that it may not blow about, and be so fixed around the branches of the tree as to afford the most complete protection. Always let a good portion of mulch be laid over the roots to protect them during winter, which may be removed about May following.

The winter pruning of the trees must be performed in spring, just before the sap begins to move. In doing this, leave as many fruitful shoots as will properly supply the tree in the manner before directed. Always retain the lowest lateral shoot upon any branch, in order to keep the tree supplied with young wood to its centre. All

shoots that are rejected must be cut clean away, except a supply of wood be wanted in such a place next year, when at this time a rejected shoot must be cut down so as to leave one bud upon it. All shoots that are retained for bearing fruit the following summer must remain wholly unshortened. After the tree is pruned let it be anointed with composition. *(See Index.)* A slight covering is sometimes necessary for a few weeks after pruning. The best for the purpose at this season is woollen nets; when the weather is settled this covering may be removed.

In the forcing of Figs in houses, the same directions in respect to pruning must be attended to. The trees will require a plentiful supply of water both at the tops and roots, particularly at the latter. In addition to Fig trees being trained to a trellis against the back wall, some may be planted in large tubs and be plunged into the border near the middle of the house. Those being allowed to grow as dwarf standards will bear abundantly. For confining the roots in tubs, promotes the fruitfulness of the trees. The heat of the house must be regulated as for forced Peach and Nectarine trees.

Fig trees may also be planted in pots and introduced into any Peach house, Vinery, or stove. Those will produce three or four crops of Figs every year. They will require a very plentiful supply of water at the roots.

The water must be poured upon the soil, and allowed to filter through it to the bottom. The watering must be regulated so as to give manure water twice, and pure soft water once, always having the water of a temperate heat, otherwise the Figs would drop off.

CHAPTER XXVIII.

On the Gooseberry Tree.

GOOSEBERRY trees like a good deep strong rich loamy soil, and almost any airy situation is suitable for them, but the crop is most abundant when the situation is favourable to their protection in spring from the cold east winds, which are frequently destructive to the blossom of those trees. Trees of this kind may be planted in quarters by themselves, in borders round the garden, or so as to train them against a trellis. In planting them in quarters, they ought to be six feet apart in the rows, and eight feet between the rows, and when it is designed to plant them against a trellis, they must be planted nearer or farther apart, according to the height of the trellis. A trellis of five feet high is what I prefer, for when it is higher it will shade the next row of trees behind, unless the trellis be fixed so as to point from south to north, but they are best when constructed from east to west, as the trees have the full advantage of the sun. Trees planted against a trellis as described, should be set four feet apart in the rows, and six feet betwixt the rows. In planting the

trees always spread the roots regularly round the bole, and at four inches from the surface; let the tree be mulched and watered immediately after being planted.

The trees afterwards require a summer and winter regulation. In furnishing the tree with wood let the bearing shoots be six inches apart. The summer regulation must be performed about the end of June or early in July, in doing which let any strong luxuriant shoots be taken away, also all suckers which may be arising. It is a practice with some persons at this season of the year to pinch off the ends of all shoots upon the tree, but I disapprove of it as a general practice, because I have had ample proof that it causes the tree to send forth a great number of useless shoots and thus its strength is thrown away.

There is also another injury done to the tree at the early part of the season by the gathering of the fruit when it is green, and before it has attained half the size it would have done. In doing this, some persons clear whole trees of the berries which were upon them; the effect of which is, that the trees being so suddenly deprived of their produce receive a very severe check, and the superabundance of sap is expended in a great production of suckers and luxuriant shoots, thus their strength is thrown away and the trees greatly injured. Instead of this

I always thin off the berries from every tree, and thus the fruit which remains is improved in size; and the object of a supply of green Gooseberries is obtained, whilst a proper reserve is left for ripening. If it be desired to have very large fruit it may be obtained by a judicious thinning, shading of the fruit from hot sun, and when the fruit approaches maturity from rain; also by watering the roots with manure water. The water which I use is, three quarts of drainings from a dunghill to one quart drained from fowls' or pigeons' dung soaked for the purpose, which must be applied so as to keep the soil in a moist condition. Let manure water be used twice and pure water once in regular succession.

The winter pruning must be performed as early in the season as possible. A proper distribution of shoots must be left throughout the tree, so that the bearing shoots be six inches apart. In shortening the shoots of a good healthy tree, cut them to twelve buds, and reserve one lateral shoot as near to the origin of each main branch or shoot as possible. Cut clean away all shoots or branches not wanted, and let all suckers be pulled or grubbed up. As soon as the trees are pruned let the mixture for the destruction of insects be applied. *(See Caterpillar.)*

When winter has set in, let a quantity

of well rotted manure be spread upon the soil to the extent that the roots reach to. The strength of this will be washed down into the ground and will enrich the soil, also be destructive of the larvæ of any insects which may be in the ground. At the following spring the best rotted part of the manure may be just turned under the soil but not to dig deeper than three inches as far as the roots extend, but the other part of the soil must be dug a spit deep. Where there is the conveniency of having well rotted tanner's bark, I should recommend that it be occasionally used instead of manure.

CHAPTER XXIX.

On the Currant tree.

THE treatment of the Currant tree is the same as that directed for the Gooseberry, with the exception of pruning. In pruning the Currant tree, always endeavour to keep a plentiful supply of young vigorous wood, as the fruit is much finer when produced from such, than from short spurs. In order to obtain suitable wood it is necessary to cut out a certain quantity of the old wood every year, and with the exception of the main limbs, let no wood be retained that is more than four year's old. The main limbs of the tree must always be disposed at a proper distance from each other so that the bearing wood may not be crowded. The shoots retained must be left about four inches apart, and their ends be cut off, strong vigorous shoots must have about three inches cut off the end, and less vigorous ones in proportion. Always use a knife for pruning the trees, and not a pair of garden shears as is generally practised.

CHAPTER XXX.

On the Raspberry.

THE Raspberry requires a deep light loamy soil, moderately enriched with well rotted manure.

Suckers with good roots may be planted early in October, so that they may strike root before winter. If they are to be treated as bushes, they may be planted in rows at five feet apart, and four feet in the rows. It is a good plan to train Raspberries against a trellis as described for Gooseberries. In planting let them be placed singly at ten inches apart, and both sides of the trellis be planted.

The Raspberry requires a summer and winter regulation. The first is about midsummer or a little later, in doing which, pull up or cut clean away to inside the soil, all suckers, except about eighteen or twenty to every bush, and to as many more as will be wanted at the winter pruning against the trellis. By doing this the fruit is improved in size, and the shoots which are to bear next year get well matured. Whatever shoots are produced after this regulation let

them be destroyed by pulling up, as soon as they are a foot or half a yard high.

At winter pruning let all the shoots which bore fruit last summer be cut away close to the ground, and to every bush leave about eight or ten of those shoots produced last summer, cutting clean away all others; after this is done they must be tied together so that two bushes will form an arch, after being tied let a few inches be cut off the ends. Of those trained against a trellis, leave as many good shoots to bear next year as will be ten inches apart, pruning a little from the ends and then tying them to the trellis. If the plants are not very vigorous some well rotted manure must be dug in round the roots, but not to dig deeper than four inches. Raspberries will bear for eight years from the time of planting, when they must be destroyed. But two years previous to this, a new plantation of them must be made in some other place, so that when the old ones are destroyed, this will be in a good bearing condition.

CHAPTER XXXI.

On the Strawberry.

The Strawberry should always have an open situation well exposed to the sun and air; and a light rich loam to the depth of twenty inches at least. I always find that Strawberries succeed the best when planted in single rows. The season which I prefer for planting is the spring, generally about the end of March, varying according to the season. The soil in which they are to be planted should be enriched with well rotted manure, (cow's dung is what I prefer) more or less according to the kind of Strawberry to be planted; the Pine, Imperial, and the strong growing kinds must not have so much manure by a great deal as the Roseberry, Boss Stock, Hautboy, and the less vigorous sorts, because too much manure causes the former to run into leaf.

When the plants come to a bearing state they require a good deal of water, which should be given so abundantly that it may sink very deep into the earth. The moistness or dryness of the season must point out the frequency of water being applied; always give them one or two good waterings before

the bloom expands, but when the blossom is expanded let the water be carefully poured in amongst the plants and not over their tops, otherwise a great number of the blossoms would be rendered abortive by the farina being washed off, but when the fruit is set (which will be discovered by the falling off of the petals) watering over the tops is of great service, as it occasions the fruit to swell finer. About the middle or end of May, all runners which are between the rows must be taken away so that there be ten or twelve inches of bare ground between them. The taking off the runners at this time ensures the production of finer fruit than otherwise would be the case. The plants must always be kept clear of weeds. When the fruit approaches maturity let watering over the tops be desisted from, and some clean straw be placed along the sides of the rows, this keeps the fruit clean and preserves them from moulding, and is easily performed. At the autumn (generally about the end of October) let all the alleys be dug over, the breadth of ten inches, and at the same time dig in the alleys some well rotted manure (cow's dung is preferable being cool.) At the following spring about the end of March, or when it is considered the severe frosts are over for that season, let all the old tops of the plants be cut clean off. I find that the plants do best when the tops are left

upon them until spring, as the leaves protect the roots from the severity of frost during winter. And when they are taken off at autumn I never could discover that the plants were strengthened by it, but were thus exposed to all the severity of winter. In dressing over the plants at spring, where there is such a quantity together that they crowd each other, let them be regularly thinned. After this is done, let some good loamy soil and well rotted manure mixed together, be sprinkled amongst the plants but not so as to cover them. After this dressing, the plants will require no more attendance than what has already been given.

Strawberry plants seldom bear fruit well for a longer period than four or five years. It is advisable therefore to make a fresh plantation every four years. The Wood, and Alpine Strawberries ought to be renewed every third year. They bear the most abundant when raised from seed. The method I practice with them is to gather the fruit and spread them open in the sun for a day or two, then wash the seeds out and immediately sow them in a bed of rich light soil. As soon as the plants are big enough to transplant, I prick them out at three inches apart in some other beds of rich soil. At the following spring I finally plant them off, and they will sometimes bear well the first year.

Strawberries may be successfully forced in any forcing house or frame. The sorts which I find to succeed best are the Roseberry, Boss Stock, and Scarlet. Bearing plants taken up from the beds in autumn previous, or runners potted off in spring, will do for this purpose. The soil must be a light rich loam. After the plants are potted off, let the pots be plunged up to the rim in a border. If any of the plants potted off in spring shew bloom the first summer, let it be pinched off as soon as observed; keep the plants clear from weeds, and let them be well attended with water at all times when required.

At the end of September or early in October, all runners that are produced upon them must be taken away. The plants will be ready for forcing the following winter and spring.

At the time it is desired to commence forcing the plants, the leaves must be dressed off and a little fresh soil sprinkled amongst them.

Established plants from the beds must be taken up at the end of September. They must be taken up with balls of earth nearly the size of the pots in which they are to be planted, and be potted in rich soil as before directed. When Alpine Strawberries are desired for forcing let them be raised by seed as already described.

The time of beginning to force the plants

must be determined by the season at which the fruit will be wanted, but it is advisable never to commence forcing before January, with the exception of the Alpine which will endure the operation much better than any of the other kinds, and plants of that sort may be forced from the end of November. When forcing is commenced in January, the plants will require ten weeks in order to perfect fruit, later in the season not quite so much time, and earlier in the season a longer period. For one month previous to introducing the plants into a house for forcing, let them be placed under a frame in a sheltered situation but exposed to the sun.—The plants may be forced in a Peach house, Vinery, stove, or hot-bed frame, but early in the winter it is far better to force them by fire heat, as the steam arising from the manure of a hot-bed will frequently rot off the bloom or fruit. In forcing them in a house, let the plants be placed within half a yard of the glass, this may easily be done by fixing up shelves, taking care that they are placed where the plants can obtain a good portion of air when desired. Always have a saucer placed underneath each pot, which will hold the overplus of water given to the plants. But in watering them (which should always be done before the soil becomes dry) let the water be poured upon the surface of the earth in the pot, and not in the feeder as is

practised by many. A little water may be sprinkled over the tops after the fruit is set, but not before. When this is done early in the season let it be done in a morning, and on those days when they are likely to have a little sun; but later in the season it may be done in the evening or morning as desired. The heat which the Strawberry requires is about 52° for the first week, after that 60° until the fruit is set, when it may be raised to 63° at which it must be kept. The attention to the heat is not particularly required as they will do with more occasionally, only that such a medium is suitable to them. A succession of plants may be introduced into the house every two weeks. When the plants have done bearing, they may be removed out of the house, and early in the season into a cooler department for a few weeks, and afterwards be turned out of the pots into the open ground. The tops must be cut off, and the plants be well watered afterwards, and they will frequently produce a late crop of fruit the same summer, and as plants are removed out of the house in succession, Strawberries may be obtained until very late in the year. A fresh supply of plants must be planted off, and turned out after being forced, every year.

CHAPTER XXXII.

The taking up, replanting, and future treatment of large Fruit trees.

THE removal of large fruit trees from one situation to another, is frequently found necessary for various reasons which need not be here enumerated; but I have sometimes had recourse to it, when a tree has grown too vigorously, which operation I never found to fail of producing the desired effect of bringing it to a fruitful state.

In performing this work, various are the methods practised and recommended, that which I have adopted for many years with abundant success, is the following:—

Take the tree up with as great a quantity of roots as possible, also secure as large a ball of earth as can be done. In taking it up, let a trench be dug out to the depth of the border at the extent desired to have the roots, (which ought not to be less than six feet from the bole of the tree.) When the trench is dug out, let the soil which is at the upper side of the general mass of roots be thrown off; after which it must be taken from the under side, this is best done by undermining them. Great care must be taken

not to bruise any part of the roots which are to remain, and always cut with a sharp knife, any roots which it is required to do, also cut each close up to a lateral one. When the tree is thus loosened, let some matts be wrapped round the ball of earth and be secured by a cord, the branches of the tree must be tied together to prevent them from damaging each other. In carrying the tree away, it must be laid with the back part downwards and by means of two poles, one made fast across the bole of the tree, round which a sufficient protection of matting has been applied; and the other placed so as to support the ball of earth. In this manner the tree may safely be removed to the place in which it is to be replanted, however large it may be.

The border in which the tree is to be planted must be prepared according to the direction given. *(See the Chapter on fruit tree borders.)* Let the hole be dug out so large that the roots may be fully extended, and so deep that they may be covered about eight inches. The soil inside the hole and upon which the tree is to be planted, must be moderately enriched with some well rotted cow's dung, also a portion of soil be enriched that is filled in immediately about the roots. Let the tree be placed so high in the hole as to allow for the settling of the border, that the roots may finally be at their proper level with the

border. Care must be taken that the soil is well closed to the roots so that no hollow places are left. After the soil is filled in, let it be moderately pressed to the roots, and the tree must be watered with drainings from the dunghill, also be mulched. The season which I prefer for performing this business is the end of October, or early in November, therefore unless the weather be very dry, the tree will not require any more water at the roots until the following spring and summer, when it will be necessary so as to keep the soil moist. After the tree is planted, the top must be sprinkled with water every other morning at least, until the end of November. It must be resumed again the following spring, and be continued as long as required. This practice considerably assists the more speedy establishment of the tree.

In respect to pruning the branches at the time of removal, I think very little is required, excepting any broken or damaged parts, or when a tree is in a weakly condition. In the latter case I shorten the branches in proportion to the extent the tree covers, so as to cut away one-fourth.

When I have determined the summer previous, to remove a tree of this description, I train in a shoot at that part of each branch I intend to prune to. But when a tree is not in a weakly state I never shorten any branch,

being fully convinced from many years practice, that it is not necessary when the preceding directions are attended to. And if a tree can be so managed as to do well and retain its entire head, it certainly must be far preferable to the practice of shortening the branches.

Healthy fruitful trees, removed and treated as here directed, I have found generally to bear a good crop of fruit the first summer, and never failed to do so the second. Also luxuriant trees have uniformly been productive at the second summer, the check they received by removal throwing them into a fruitful state.

CHAPTER XXXIII.

The renovating of old and neglected Fruit Trees.

First of those kinds which principally produce their fruit upon spurs such as Apple, Pear, Plum, Cherry, &c. It is not uncommon to see trees of the kinds enumerated, after they have been planted, trained, and pruned, for twenty years and upwards, agreeably to the method generally practised, disfigured with spurs projecting from the wall ten or twelve inches, and in many cases more than that distance. The general result of such bad management is, that the trees do not bear their due proportion of fruit, *(see the Chapter on spurring fruit trees)* neither is that produced near so fine as it would have been, had the trees been treated according to directions laid down in this treatise.

However trees of the before mentioned description may by a judicious treatment be recovered and brought to a much better condition, also to bear nearly equal to young trees of a similar size. In order to effect this object, at the winter pruning a great number of the spurs must be cut down to about half an inch from the origin of each; but if some of these branch spurs have a lateral

spur situated within two inches of their origin, such spurs must be pruned off just above each lateral one alluded to. The quantity of spurs to be left untouched, must be one every six inches; these must be trained to the wall betwixt the main branches, alternately along them, so that there will be twelve inches or upwards from spur to spur of those trained in at the same side of each branch. The distance described is most suitable for Plums and Cherries, but Apples and Pears must be sixteen inches apart. If there be any lateral spurs upon those branch spurs to be trained in, which are an hindrance to the spur being nailed close to the wall, let such parts be pruned away. The lateral spurs upon those branch spurs nailed in, will during the following summer, mature a great portion of fruitful buds, and they will generally bear fruit abundantly the second summer. From the remaining parts of those branch spurs which were cut down to half an inch as directed, there will frequently arise a new spur from each the first or second year, such must be afterwards treated in every respect according to the instructions given in treating upon each fruit tree respectively. If upon any of those spurs cut down to two inches from their origin, there should be a fruitful bud or a shoot produced near to the origin of the old spur, let all that part of the spur above such new bud or shoot be pruned entirely away at the following

winter pruning. In addition to new spurs being produced from the old ones cut down, a great many shoots or fruit buds will frequently arise along the main branches where spurs were not situated before. All such must be treated as directed for young trees.

In making choice of spurs to be nailed to the wall, choose the cleanest and most healthy and such as are at the sides of the branches which they are produced from, so that they can be trained to the wall without having to force them much from their natural direction.

If a strong leading shoot pushes from any of those branch spurs trained in, let such a shoot be nailed to the wall, and at the following winter pruning cut it back up to the next spur trained in at the same side of the branch, at which length it must afterwards be kept.

When there is a proper supply of good bearing spurs obtained upon the main branches, so that a sufficient crop of fruit may be expected without retaining all those spurs trained in, let a portion of them be pruned away to the lowest bud upon each, only retaining such a supply as is directed to be trained in upon each respective kind of fruit tree.

At the time when the spurs are pruned in as directed, the tree will require to be cleaned. This is always essentially neces-

sary in trees that have had long spurs upon them, because for want of a due portion of sun and air, it will always be found that a great deal of lichen or moss has been produced upon the branches and spurs, which closes up the pores of the wood and consequently renders the trees unhealthy and unproductive. *(See the Chapter on spurring fruit trees.)*

In order properly to clean the trees, let them be sprinkled over with water and then be well rubbed with a hard brush in every part where it can possibly be done, taking great care not to break off any part of those spurs which are to remain. After a tree is thus cleaned, let it be anointed with composition proper for the sort of tree.

In treating upon those trees which do not generally bear fruit upon spurs, such as Peaches, Nectarines, and Apricots. I shall add but little in this Chapter, because in fact I know not any method that can be practised upon old neglected trees of those kinds, (in order to get the wall covered with good fruitful trees) equal to that of planting young ones that have been previously trained for two or three years. *(See the Chapter upon Peach and Nectarine trees.)* But when necessity induces to the cutting in or heading such trees, they must always be pruned to a leading shoot, so that the sap will have a channel in which it can be immediately em-

ployed advantageously. The necessity of having recourse to this practice may arise from circumstances similar to the following. I have been credibly informed that in some parts of England young trees never bear so abundantly neither prosper so well in any way as what old ones do, and from this circumstance, old trees are purchased, headed down, and planted instead of young ones.

When a large cut is made, let it be in a sloping direction, so that the wet may not be permitted to lodge in the wood. When there is reason to fear such injury, let a composition of soot and train oil be mixed together stiff, and be laid over the wound, in order to keep out the moisture, which is the chief effect of compositions applied in this manner. Always let a cut be made as smooth as possible, because it will thus heal the sooner.

CHAPTER XXXIV.

The renovating Fruit Tree borders.

When fruit trees are weakly through the defective state of the border, in its being exhausted of the nutriment which is necessary to be afforded from such a source, it will require a renovation in order to recover the vigour of the tree. In the performance of this business, let the following observations be attended to.

Let a trench be made about four feet wide and to the depth of the border, it must be made in the direction from the front of the border to the trees; but so as not to approach nearer the wall than about five feet. In digging out the soil be careful not to damage the roots; this may be avoided by beginning to dig at one side of the trench to the bottom, and then undermining the remaining part, always keeping one open trench betwixt that part of the border trenched and the other part to be trenched. About one-half of the worst part of the soil must be taken entirely away, and a suitable portion of fresh loam moderately enriched with rotted cow's dung or vegetable manure, be substituted in its place.

Previous to filling up each trench, the roots of the trees will require pruning. All damaged parts must be cut clean away; also cut off about four or five feet from the end of every strong root which may have got to the extent of the border, and prune away such as are inclined to the under stratum. In shortening the roots always cut them clean off close to a lateral. As the trench is filling up, the roots must be regularly placed upon the soil about five or six inches higher than their regular level, so that when the soil is finally settled the roots may be at their proper level and natural direction. After the roots are covered with soil a few inches thick, let the earth be pressed gently upon them, and when the trench is fully filled up, let there be a good portion of drainings from the dunghill or soft water be poured upon it to settle the soil to the roots. The season which I prefer for the performance of this work is the end of October or in November, as when done so early the roots get established a little in the soil before the following spring, and which greatly assists their growth during summer.

CHAPTER XXXV.

On the Orchard.

THE situation for an Orchard should always be one that has the advantage of a free circulation of air and is well exposed to the south, also to incline a little to the south-east, south, or south-west. For when the situation is low and close, the trees are very liable to become mossy, which always injures them by closing up the pores of the wood. They are also more liable to be affected by blight. Although having an Orchard closely pent up by trees, &c. is injurious, nevertheless a screen of forest trees, at such a distance from the fruit trees as that the latter will not be shaded by them, is of very great service by protecting the trees in spring from severe cold winds. A good strong loamy soil not too retentive of moisture, to the depth of thirty inches or three feet, is most suitable for an Orchard. Great attention must be paid to the substratum so that the ground is well drained, for if the top soil be ever so good and the bottom be wet, it is a very rare case to find that the trees will prosper for many years, before they begin to be diseased and go to decay. As it is so indispen-

sibly necessary to the success of Orchard trees that the bottom be dry, if it be not naturally so, it must be made so. The extra expense caused by making it dry, will soon be repaid by the fertility of the trees. And they will continue to bear fruit many years after such trees as were planted at the same time in soil with a wet bottom. When it is necessary to make the bottom dry by draining, it must be done half a year before the time when the trees are to be planted. In performing this work, the ground (as in all cases) must be trenched, and when the trench is open, stones or brick bats, &c. must be laid over the bottom to the thickness of six inches, a little of coal ashes or small gravel must be sprinkled over the top of the stones, &c. and then the surface be gently rolled. Also drains must be made in different directions so that any excess of moisture can be taken entirely away from the ground. The natural richness or poverty of the soil will point out the necessity or otherwise, of mixing some well rotted cow's dung amongst it. But more immediately about the roots of newly planted trees, always mix a portion of manure as described, taking care that it is well incorporated with the soil, for if left in large masses, it is injurious to the trees. In planting a tree, never place the roots deeper than is absolutely necessary for supporting it, eight

inches from the surface is quite sufficient for the purpose. The distance at which the trees are to be planted, must be regulated according to their sorts, the dwarf kinds nearest, and taller sorts farther apart. I prefer planting them in the quincunx manner. The dwarf Apple trees worked upon Paradise stocks which are in so great estimation in the Islands of Guernsey and Jersey are very excellent for an Orchard, and are worthy of a more general cultivation in this country. The trees will bear abundantly the third or fourth year after working, and when they will not be more than four feet high. On account of their dwarf habit they may be planted in rows ten feet apart and nine feet in the rows, the produce of such trees are very abundant, and their appearance is beautiful. The dwarf kinds of the sorts of Orchard trees generally cultivated in this country may be planted twenty-four feet apart, and the taller kinds from thirty to thirty-five feet.

As the distance stated is that, at which they are to remain for bearing, it is a very good method (particularly in the cold parts of this country) to plant some of those kinds of fruit trees which speedily come to a bearing condition in the spaces between those which are finally to remain; and as the latter advance in growth, cut the others away, or remove them to some other situation.

The Hawthorndean, and Keswick Codlin Apples, with many other good sorts, are very suitable for the purpose described. After the trees are planted, let them be mulched, watered, and secured by stakes and hay bands, to prevent their being loosened by the wind. Nothing whatever ought to be cultivated in the ground as far as the roots of the trees extend; but during summer, let it be kept clean hoed to destroy all weeds.

In respect to pruning of Orchard trees, it is not possible to lay down directions that will apply to all kinds, as done to wall trees. But a few general observations may be given which if attended to will be highly beneficial. It is indispensibly necessary to keep all the branches so far apart that they may not rub against each other. The bearing shoots ought to be several inches apart. As many kinds of trees grow in a form peculiar to themselves, such as grow in a conical form must be kept so, and have the branches properly regulated, but such as do not must be attended to so as to bring them as much as possible to that form. Trees pruned and regulated after this manner are never so confused as otherwise is generally the case, and by the branches being horizontal, the trees are more fruitful.

The forming of the head of a tree must be commenced the first spring after being planted, by retaining a proper supply of

young shoots, and rubbing off all others. In forming the head always endeavour to retain an equal quantity of branches on every side, so that the tree will be equally poised. When wood is wanted, the end of a shoot must be stopped in order to produce a sufficiency. If the upright lead of a tree should at any time be accidentally broken, let a lateral shoot be tied up in a straight direction for a substitute. The second winter pruning must be performed at the end of Autumn, and a proper reserve of branches be left, also cut away all others.

This attention to forming the head must regularly be paid in every future year, but after the third year from planting, never shorten the end of a leading shoot. After the trees come to a bearing condition, they must be regularly pruned every year, keeping the branches at the distance directed, and not retaining too much young wood in the interior of the tree; but that the sun and air may have free access amongst the branches. Trees that are regularly pruned every year will bear more abundantly, and have finer fruit than such as are pruned only once in ten or twenty years, as is too generally the case.

When a tree is weakly or ill shaped, through a bad system of pruning, or by the neglecting of it, the most expeditious remedy is to head it down; in doing which cut every

main branch away, so as only to leave about one foot remaining of each. When a tree is defective through age, it must be headed down as already described, and the soil must be taken off the roots at a considerable distance from the bole, and when the roots are bare, let some of them be shortened, and any that are found to have struck perpendicularly down into the under stratum must be severed off; let a quantity of well rotted cow's dung and fresh soil be trenched in around the tree.

When a tree is diseased from being affected by moss or lichen, it must be brushed over and anointed with composition. *(See the Chapter on renovating old and neglected fruit trees.)* It is a practice with me to anoint standard trees with a suitable composition, as far as it can conveniently be done, every third or fourth year; also every autumn and spring to sprinkle the trees frequently with soap suds, this is easily performed, and the vigour and health of the trees are greatly promoted by it, whilst at the same time, insects with their larvæ are also destroyed.

It is of very great service to thin the fruit of Apple and Pear trees as far as is practicable. The time for performing which is, as soon as it begins to swell, and only to leave one fruit to each spur. By attending to this, the fruit which remains will be very much improved, and that which is lost in number is more than

made up in the size of those retained. Also the tree is more certain to mature a sufficiency of fruitful buds to bear the following year, without which precaution it would not be the case. The injurious effects of omitting to attend to thinning of the fruit, is very frequently discovered by trees being nearly destitute of fruit for one season, during which they regain their strength; and then the following year they will have an abundant crop, which weakens them. I have seen many instances of this description where they have alternately been loaded with fruit, and then nearly barren.

In the spring just before the blossom opens, it contributes very much to the certain setting of the fruit, to pour a large quantity of water over the roots of the trees; as much water as will settle to the depth of half a yard or two feet should be given. When I have manure water I use that for the purpose, otherwise soft pond water. Were it not for this practice in dry seasons, a great portion of the bloom or young fruit would drop off. After the fruit has begun to swell, I repeat the watering at the roots.

When a tree turns out to be of a wrong kind and it is desired to change it, this may be done by inserting a graft of the desired sort, and pruning the other away. If the tree had previously made considerable progress, one graft may be inserted to grow erect, and one to

each of the side branches*. Whatever shoots of the original kind may afterwards push, let them be cut clean away.

At the spring of the year when the trees are in bloom, it is a practice I adopt with great success to smoke the trees well, by burning some moist straw near them, taking the advantage of a favourable day, so that the smoke will be conveyed to the trees. According to the quantity of smoke produced, and its remaining about the trees, or its being quickly blown away, I am determined as to the length of time to continue the smooking, but the longer it is continued, the better. This practice destroys a great number of insects which are then moving about the trees. Remedies for the various insects and diseases with which the trees are attacked will be found in the Chapter upon each respectively.

On gathering Apples and Pears.

All fruit that is designed for preserving must be hand picked, and great care be taken that they are not bruised either in gathering or conveying them to the fruit room.

The best time to gather the fruit is when

* The best scions for grafting are those of the leading fruitful shoots with a wood bud at the end.

the seeds have become of a dark colour, in some sorts they are nearly black, and in others brown. When a fruit or two drops naturally off, it is a sufficient intimation that the greater part of it is in a proper condition to be gathered. Always let the fruit be gathered when dry, and keep each kind that is to be preserved, separate to itself.

A fruit room ought always to be dry and airy, and it is very serviceable to have shelves fixed up round the room; they should be made so that the bottom be composed of bars, and spaces be left to admit the air underneath; also to have an upright front board so that each shelf may be eight inches deep inside, their breadth may be as desired. Tiers of such shelves may be erected one above another. When the fruit is brought to the room, let it be laid in heaps upon some clean dry straw, and afterwards be covered with dry straw or matts. It must remain in this state for a fortnight, when it will generally have sweat well, after which, each fruit must be dried with a flannel and be laid upon the shelves, before the fruit is placed on the shelves, there must be two or three inches thick of clean straight wheat straw spread, upon which the fruit must be placed. If there be a sufficient quantity of shelves, so that the fruit may be laid singly, it should be done so; but if not a sufficiency of shelves to admit of it being so placed, it

ought not to be laid thicker than six inches. After the fruit is laid on the shelves, it must be covered two or three inches thick with clean straw. It will afterwards be required to occasionally look the fruit over, and any that are damaged must be taken away.—Nothing more is necessary than to keep the frost from the fruit and to preserve it from damp air.

CHAPTER XXXVI.

On insects and diseases to which fruit trees are incident, with remedies for them, &c.

In treating upon the various insects and diseases with which fruit trees are attacked, I do not consider that it is necessary to enter into a long, or philosophical detail of them, as such descriptions and details have already appeared, and a repetition of them in this work would answer no very valuable end; for the general knowledge of the insect or disease, with the short description which will be hereafter given, and the application of the remedies which will be laid down, will eventually answer every practical purpose.

On the Acarus, or Red Spider.

This insect is so small as to be scarcely discernable without the aid of a microscope, it attacks most kinds of fruit trees, and may generally be discovered at the under side of the leaves. It particularly attacks those trees that are forced, a dry heat being very favourable to it; also in a dry summer trees which are out of doors will frequently be

infested. Whatever tree is attacked by it, will speedily exhibit symptoms of its mischief, by the foliage turning a pale sickly colour, which is caused by the insect biting and extracting the juices from the leaves. Pure water or soap suds, applied by means of a syringe or garden engine, will destroy this insect; but the latter is preferable on account of the ingredients of which soap is composed, (and a small portion of which adheres to the leaves after a washing with them) being a preventive for a short time, of the insects which survive fixing again upon the foliage thus washed. The more forcible the water, &c. is applied, the better the effect produced, because the force of the water breaks the webs of the insect, and by it being thus dislodged, falls to the ground and is destroyed by the wet. It must always be endeavoured to apply the water to the under side of the foliage, as the insect is chiefly to be found there. When trees are much infested a frequent repetition of watering is necessary.

The time for washing trees out of doors, should always be done just before the sun leaves them, so that the trees are kept in a moist state until the following morning, which will be a much longer period than if applied in a morning.

When trees cultivated in a house are attacked by this insect, in addition to the

washing recommended, a strong steam must be raised morning and evening by pouring water upon the heated flues.

Trees that have the composition, as directed for each kind, applied to them in autumn, will very seldom be infested by the red spider, as the composition destroys all the eggs which may be upon that part of the tree to which it is applied. Care must also be taken to clean the walls. *(See the Chapter on nailing fruit trees.)*

On the Aphis, or Green Fly.

The green fly or plant louse, attacks most kinds of fruit trees, but particularly Peaches and Nectarines. Their attacks are principally directed to the ends of the young shoots, and their ravages are rendered the more destructive, by reason of the very critical time at which they attack the trees, which is frequently before the young leaves have expanded themselves.

The reason of their being so prevalent at so early a season is, that whenever any of their eggs have been deposited in any part of the tree or wall (as they will frequently deposit them at the end of autumn behind the buds, or at the divisions of the shoots) they are hatched by the influence of the sun in spring, and the first brood of those insects

are generally strong enough to commit their ravages by the time that the Peach and Nectarine trees begin to shoot. The number of them increases amazingly fast, almost beyond credibility; this has been attributed to the east winds, which it is supposed brings them, because the east winds generally prevail a great deal at the spring of the year. But this is altogether a mistake, for it is asserted by some writers, that one impregnation of the male with the female extends to the production of ten generations.

At the end of the year a small black fly may be observed removing in every direction about the trees, this fly is at this time depositing its eggs in the trees. A hundred of its eggs will lay in a very small compass.

To destroy their eggs is the best practice that can be adopted to get rid of those insects. This may be done by carefully applying the composition in autumn, as directed for each sort of tree. But if they be arrived at an active state as seen in spring, immediate attention must be paid to destroying them in some other manner; for if they remain a short time without molestation, they bite the tender shoot and foliage so as to stop its growth for a while, which if done at this season, considerably injures the wood from which the fruit is expected next year; they also bite and injure the young fruit. The best mode of destroying them in this

state is, to smoke the trees. They may also be destroyed by sprinkling snuff or tobacco dust upon them; but the former method is cheaper and more efficacious, as the smoke will reach where the snuff, &c. could not well be applied. The method I adopt in smoking the trees is, to make fires, of moist pea straw and tobacco mixed together.

The tobacco I use for this purpose is what I grow myself, and is dried previous to using.

If the wind be in such a direction, that if fires be made opposite the trees, (and at a few feet distance from them,) the smoke will be conveyed to them, this must be done; but otherwise a cloth must be fastened over the trees and smoke be introduced underneath it, by means of a proper smoke bellows. Immediately after the smoking has been performed, let the trees have a forcible washing by means of a syringe or garden engine. In some seasons a repetition of the smoking will be necessary. After the smoking and washing has been performed, let the soil underneath the tree be trodden well, or beat with a spade, otherwise a slight sprinkling of boiling water be poured over it, in order to destroy those insects which have been dislodged and fallen upon the ground.

On the Aphis Lavata, American, or White Bug.

This is one of the most destructive insects which fruit trees are infested with. During winter the insect generally disappears, by creeping into any diseased rugged parts of the tree, or by descending into the ground, where it may be found feeding upon the roots. Early in spring it issues forth, increases very rapidly, and will continue its ravages until autumn unless destroyed, when it again removes as before stated.

This insect may be destroyed by attending to the following directions. When wall trees infested by it are pruned in autumn, all such parts as are cut off must be burned, and the nails and shreds be boiled, &c. *(as directed in the Chapter on nailing wall trees.)* When the tree is completely loosened from the wall, the wall must be swept and anointed with composition, and afterwards the tree in every part. The composition must be applied by means of a soft brush. The following are the ingredients of which the composition is made. To four gallons of water, add one pound of soft soap, two pounds of common sulphur, half an ounce of black pepper, and one gill of train oil; let these be mixed together and boiled for twenty minutes over a slow fire. It must be laid on in a tepid state, or what is called new milk warm.

After the upper part of the tree is done, it will likewise be necessary to pay attention to the roots, in order to destroy those that have descended into the ground. The means which I have adopted with the greatest success are, about one week previous to the time of laying the composition upon the upper part of the tree, a quantity of necessary manure is put into a tub and half that quantity of soot. These mixed together with an addition of strong soap suds; remain together for one week, and are stirred up every day during that period. The mixture is then poured over the roots of the tree for five or six feet round the bole. The beforementioned applications will generally at once completely destroy this insect. In very bad cases a repetition may be necessary the winter following. After the insect is destroyed, the trees may have the composition adapted to each sort applied, as directed regularly to be laid on. When Peach, Nectarine, or Apricot trees are infested by this insect, the composition as before directed to be applied to the upper part of the tree, must be made weaker, by putting eight gallons of water to the quantity of ingredients described. Standard trees may be treated in every respect as wall trees.

There is another insect of the aphis tribe which infests Peach and Nectarine trees, its appearance is a dark brown, and its form is

like a boat turned the wrong side upwards. It adheres very closely to the branches. Its destruction may be effected by attending to the following directions:—

Let the branches infested with it be scraped with a blunt knife, and afterwards let the tree be anointed with the following composition.

To four gallons of water, add half a pound of common sulphur, half a pound of soft soap, one ounce of nux vomica, two ounces of tobacco, and a quarter of an ounce of black pepper. The nux vomica must be grated small previous to boiling. The whole after being mixed together, must be boiled for half an hour. This will completely destroy any insect of this kind which may be left upon the tree.

When the tree is scraped previous to applying the composition, a cloth should be spread underneath, that the insects dislodged may drop into it, and then be destroyed.

On Blight.

A sudden transition from cold to heat, or from heat to cold, is frequently observed to produce blight in fruit trees, and the more certainly, as the tree is weak. Indeed any damaged branch upon a healthy tree, from its being bruised by a hammer or any other

cause, is the first to be attacked by it. When care is taken that the trees are not bruised by any means, and properly trained, also that they are watered, &c. as directed in this treatise; it will but rarely happen that they are affected by a blight.

When a garden is situated in a low, and close situation, fruit trees are in such a place more liable to be attacked by blight, than in a situation of an opposite kind, and in the spring, fruit trees in the circumstances above stated, will sometimes be effected by blight which will destroy the part so injured in a day or two; against such a blight I know no preventive equal to the following. Just before sun rise, let the trees be sprinkled over with soft water, which sprinkling acts as a medium betwixt the extremes of sharp spring frosts succeeded by hot sunny days. A permanent covering during spring is also a preventive of this injury.

When a branch or two upon a tree is affected by blight, it may be perceived by the withering of the leaves, which will occasionally be immediately attacked by numerous insects. Whenever this is the case, let the tree be smoked, and afterwards let the injured part be well washed with soap suds, and then be sprinkled with sulphur, this will sometimes stop the disease; but if the affected part so washed, &c. does not appear

to recover a little, let it then be immediately pruned clean away, and close up to a good lateral shoot. For when a branch is affected by blight, the part first injured becomes in a short time shriveled, and the disease has always a tendency to spread, which may be perceived by a careful examination of that part of a branch immediately below that which has been first attacked, and by a removal of the outer (apparently healthy and sound) bark that the inner bark has become brown, and in some cases nearly black, whilst the diseased sap gives out a strong effusive smell. This appearance will be found to spread down the branch, to a greater or less extent till it dies away in a point, and any lateral branch which may happen to be within reach of this decay, will be destroyed.

On Canker.

This is brought upon trees by various means, from injudicious pruning, from bruises &c. in nailing, or from a bad sub-soil, and in some cases it is an inherent disease. If the directions for preparing borders, choosing trees, pruning and anointing them, &c. that are laid down in this work, be strictly attended to, the trees will seldom be affected with canker.

When any canker is observed, the part

affected must at the winter pruning be cut clean out, and the part thus dressed be pared, so that no water may be able to lodge in the wound. When this is done, let a quantity of soot be mixed up with water, after which let a little train oil be worked well amongst it, but so that the mixture finally remain stiff. This must be plastered over all wounds that have been dressed, and it will generally remain without any securing to the branch, &c. The application of this mixture keeps out the wet from wounds where it would be likely to lodge, and both the soot and oil promote vegetation.

When trees are affected by canker from having a bad sub-soil, it is in vain to apply any remedy till the ground is properly drained, and some fresh soil be mixed with the natural soil of the border, also the tree replanted.

If through age a tree become diseased so that a part of it decays, in addition to other means previously directed to be employed, the decayed parts must be cut clean away, and if required an application of this mixture must be given.

It will sometimes happen that by accident a large wound will be made, in which case nature itself would in many instances effect what is desired, but when we can assist nature it is advisable to do so. Therefore whenever a wound is made, let

all fractured parts be pruned clean away, so that it is brought to as smooth a state as possible, and if it be judged that wet is likely to be retained without some precaution being used, let an application of the mixture as directed for cankered wounds, be given.

Those trees that are affected with gum may be treated in the same manner, by dressing off the diseased part and applying the composition as directed.

On Mildew.

Peach and Nectarine trees are very frequently attacked by this disease, particularly so in a low damp situation, because in such there is generally stagnant water at the bottom of the soil, which is almost certain to produce the mildew without great attention has been paid to draining, &c.

There are some kinds of Peach and Nectarine trees very subject to this disease, and in which it seems to be inherent, but more or less appears according to the favourableness or unfavourableness of the situation in which they are planted; or as they may be affected by the weather, which will also produce it. For although a border be properly made and adapted to the trees, yet if very foggy weather continues for a few days, and the soil of the border is not in a state of

moisture similar to that of the atmosphere, the trees will generally be attacked by mildew; but when the weather is foggy, and the border be in a tolerable moist state, to the depth and extent to which the fibrous roots run, the trees will rarely be attacked by this disease. This may easily be proved in a Peach house, for let the border be kept dry, and keep the house for a few days in a steam, and the trees will soon mildew. This circumstance I have observed for many years, and have uniformly found it to be the case. Mildew will also be produced from the soil of the border having been planted in for many years, and during that period has not had a renewal of fresh soil mixed with it. In that case a renewal of the border *(See the Chapter on renovating fruit tree borders.)* is indispensible in order to prevent the disease; therefore it must always be endeavoured in continued foggy weather to keep the border in a proper moist condition. This may be effected by giving it one good watering, so that it will sink to the depth and extent of the fibrous roots.

When the border in which the trees are planted is of a great inclination, so that rain will run quickly from it, they will generally be attacked by mildew, and the leaves of the trees will also be frequently curled and blotched. In this case attention must be paid to watering, mulching, &c.

When copings of walls are so constructed that the drip from them falls upon the trees, it will likewise frequently cause the mildew. But if the directions given in this work in reference to a proper soil for each kind of fruit tree, making of the borders, and in watering the tops and roots of the trees, be carefully attended to, they will very rarely be attacked with either mildew, curled, or blotched leaf.

The following practice is what I have adopted with great success as a preventive of mildew, &c. Just before the bloom expands, the tree is sprinkled with water, after which it is dusted all over (particularly the young shoots) with common sulphur mixed with a little Scotch snuff or tobacco dust. The beneficial effects of this practice I have satisfactorily realised for many years. However when a tree is affected by mildew, let it be immediately sprinkled with soap suds and then be dusted over with sulphur and snuff as before described. It is the practice of many persons to wash those trees that are affected with mildew, frequently with soap suds and urine and other mixtures, which repeated washings tend to promote, instead of destroying it.

It is also the practice of others to renew the soil of the border, but although this is advantageous in some respects, it will not be an entire preventive of mildew, because

the state of the weather and border as before described will affect the tree in some degree.

On the Thrips.

This is a very small insect scarcely visible to the naked eye. It attacks the young and tender leaves of many kinds of fruit trees, and does considerable injury to the young shoots if not soon destroyed, for by its biting the foliage and shoots it will injure them so as to stop their growth. It may be destroyed in the same manner as the green fly.

On the Honey Dew.

This is generally known, being a clammy substance which coagulates upon the leaves and wood of trees. It so much affects them sometimes, as to close up not only the pores of the leaves, but of the wood also in a very great measure. A speedy removal of it is highly necessary, as the growth of the tree is frequently stopped by it; this may be done by frequent and forcible washing with pure soft water.

On the Dolphin, or Black Beetle.

This is a small black insect, which attacks

the tops of the young shoots of Cherry trees. In may be destroyed in the following manner. Let some moist straw, with a small portion of common sulphur sprinkled amongst it, be burnt near the trees, so that the smoke will be directed to the infested branches, and a little time afterwards let the trees have a forcible washing with soap suds.

On the Caterpillar.

The most formidable of this species are those which attack Gooseberry and Currant trees. The following is the practice I have adopted for many years with very great success, upon trees of those kinds under my care.

During the winter season, the eggs of the insects are deposited in crevices and joints of the tree, also in the ground. It is whilst they are in this state that my applications are directed. As soon as the pruning of the trees is completed, I have all the refuse shoots, &c. raked clean away and burnt: the trees are then washed over with the following mixture. A good portion of quick lime is put into a tub with some water. In three or four days afterwards this is sprinkled over the trees. When it is taken out of the tub, it is well stirred up, so that a portion of the lime is taken with the wa-

ter. Immediately after this has been done, a quantity of powdered quick lime is cast in amongst the branches. Instead of this the trees may be washed with the following composition: to twelve gallons of water, add half a pound of tobacco and six ounces of black pepper; these must be boiled together for half an hour, and when cold, be used.

At the following spring just before the trees come into bloom, I have all the trees sprinkled over with lime water, and whilst in a wet state I have a quantity of fine powdered quick lime thrown amongst them, taking care to apply it at the under side of the foliage, and that no part of the trees is omitted. Also a little quick lime is spread over the roots of the tree, or some of the mixture as directed in the treatment of the American bug. Soon after the berries are set, I smoke the trees well by burning some moist straw near them, taking the advantage of a favourable day, so that the smoke will be conveyed to the trees. If the practice here laid down be fully attended to, it will be very rare that the trees will be attacked later in the season, providing that there are no other trees in the neighbourhood, which are omitted. For when this is the case, the flies during summer will very probably visit the trees that have been treated as directed, and a numerous progeny will be the consequence. When this occurs, let the

trees be looked over immediately after it is discovered that the insects have begun their depredations, and all that can be found, be picked off. This is readily done, and is very effectual. If the insects increase very rapidly, let the trees be sprinkled over with lime water and powdered quick lime as directed to be used in spring, also some lime be spread over the roots.

There is one of the caterpillar species that attacks the Cherry tree. This insect when in its fly state is a small brown moth about half an inch long. It deposits its eggs during the end of summer in various parts of the tree, which at the ensuing spring are brought to life by the influence of the sun. As soon as ever it is arrived at its caterpillar state, and is capable of issuing forth, it commences its ravages. It generally brings two or three leaves in contact, in the midst of which it fixes a web and there conceals itself during the greater part of the day, but towards night it leaves its retreat and commits its ravages. Trees infested by this insect must be forcibly washed over with lime water, likewise be sprinkled over with powdered quick lime. This application will destroy all those it reaches to, but as some are so closely concealed they will sometimes escape this operation; a few days afterwards the trees must be looked over, and all insects that escaped must be pinched to death.

Although the directions given are effectual when pursued, yet it is a practice with me to destroy the insects in their larvæ state, by the application of the proper composition for Cherry trees, at the winter pruning. And by regularly attending to it, the trees under my care have not been attacked by this insect since its first application, which is nearly twenty years.

Standard trees ought to be treated in the same manner as already directed, by anointing them with composition as far as is practicable, and then washing the trees, by means of a syringe or engine during winter, with strong lime water and soap suds. Also to burn some moist straw underneath the trees, at the spring. *(See the Chapter on Orchard trees.)*

The means directed to be employed for destroying the caterpillar which infests the Cherry tree, are equally applicable for the destruction of that which generally attacks the Apple tree.

CHAPTER XXXVII.

On Compositions proper for each kind of Fruit Trees.

THERE are a great many other kinds of insects, than what has been treated of in the preceding Chapters, which attack fruit trees, but their depredations are not attended with such damage as those already mentioned, and their injurious effects will generally be obviated by pursuing the method which I practice. It is to anoint with composition, all the trees under my care, immediately after the winter pruning.

The constitution of some trees will bear a much stronger mixture of ingredients than others; but the proportions as hereafter described, are what I am certain will not be injurious to any, but will be effectual in the destruction of the larvæ of insects.

DESCRIPTION OF COMPOSITIONS.

For Peach, Nectarine, and Apricot Trees.

To eight gallons of water add one pound of soft soap, two pounds of common sulphur, and half an ounce of black pepper.

For Pear, Apple, Cherry, and Plum Trees.

To four gallons of water add one pound of soft soap, two pounds of common sulphur, two ounces of tobacco, and one ounce of black pepper.

For Vines and Figs.

To four gallons of water add half a pound of soft soap, one pound of sulphur, and a quarter of an ounce of black pepper.

All those ingredients must be boiled together for twenty minutes at least, and when in a tepid state are fit for use.

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